Lucent Technologies
Bell Labs Innovations



Service Level Management and Service Level Agreements

Highlights

- Six out of ten respondents with service level management (SLM) capabilities in place are satisfied with those capabilities.
- People and process issues are the top challenges to implementing or improving SLM for three-quarters of respondents. Only one-quarter identify technological issues as their top challenge.
- Improving SLM capabilities remains nearly universally important (96 percent of respondents). Network availability and customer satisfaction rate highest in importance for measuring SLM.
- Network management platforms and fault-notification handling tools are rated as the most effective of SLM tools, both of which increased in effectiveness since the 2000 SLM survey.
- Ninety-five percent of respondents in enterprises consider service level agreements (SLAs) as important in the process for selecting a network service provider. However, the top barriers to achieving SLM goals are the difficulty in measuring, defining, and negotiating SLAs.
- The top objectives for SLAs with external service providers are to define required performance levels and measure quality of the service provided.
- Top objectives for SLAs with internal organizations are defining required performance levels and measuring customer satisfaction.
- Within the next six months, 45 percent of enterprise respondents expect to add trend analyses as a component of their SLAs with external service providers.

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About Lucent Enterprise Professional Services

Lucent Enterprise Professional Services provides a full lifecycle of services and solutions that help clients plan, design, implement, and operate networks in today's rapidly changing and complex environment. We have a proven track record of more than 15,000 consulting engagements worldwide.

Lucent Technologies is headquartered in Murray Hill, New Jersey, USA. Visit the Lucent Services Web site at www.lucent.com/services

About Lucent Network Industry Surveys

Lucent Enterprise Professional Services conducts industry survey projects intended to provide IT managers with insight into key issues impacting the ability to develop and deploy network-centric business applications. Previous survey report topics include:

- ASP Network Infrastructure
- E-Business Network Architecture/Infrastructure
- Enterprise Operating Systems and Directory Services
- Management Intranets
- Network and Systems Management Total Cost of Ownership
- Network Challenges and Opportunities in Uncertain Times
- Network Convergence
- Network Operations Centers
- Network Professionals Job Satisfaction
- Network Quality of Service
- Network Security
- Performance Management and Engineering
- Remote and Mobile Network Access
- Remote Network Management
- Service Level Management
- Storage Networking
- Virtual Private Networks

To see the results of these surveys, go to the Lucent online Resource Library at **www.lucent.com/knowledge/resourcelib** and click on "Case Studies."

To participate in the latest Lucent network industry survey, visit our Web site at: **www.lucent.com/services.**

For more information regarding the network industry survey program, please contact:

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Introduction

Network managers have a wide array of network services and providers from which to choose. Making the right choices can improve performance and satisfaction. However, long-term success requires careful and diligent monitoring of these service levels once established. Using service level agreements (SLAs) wisely can bolster the ability to monitor and maintain acceptable network performance. But without a clear understanding of how to set SLAs, network managers may pay too much for too little from service providers. Being good at negotiating and establishing processes is just as important in this endeavor as being a good technologist.

From December 1, 2001 to January 18, 2002, Lucent Enterprise Professional Services conducted a Web-based survey on service level management (SLM), which was completed by 134 network professionals around the globe. The results of this survey yield valuable insights into the current and future service level management strategies of today's enterprises. Moreover, these results identify the significant barriers and challenges network professionals face as they plan, design, and implement networks to enable their organizations to support business strategies. These results should enable networking organizations to better understand how their service level management and service level agreements compare with others in the industry and identify possible areas for improvement. Complete results for all Lucent industry surveys are available in the Case Studies section of the Lucent Resource Library at: www.lucent.com/knowledge/resourcelib.

For the purposes of this survey, service level management was defined as the set of activities required to measure and manage the quality of information services provided by service providers and to internal organizations. A service level agreement was defined as a contract between a provider and a user that specifies the level of service that is expected during its term.

The Bottom Line

The barely perceptible improvement in satisfaction with SLM capabilities shows that this discipline still has a long way to go. The hopeful news is that the increasing effectiveness of SLM tools provides the platform for delivery of service levels that meet users' expectations and needs. However, in today's environment of reduced resources and increasing reliance on networks to conduct business, network managers need to keep their eyes on the SLM ball. This survey points to a number of key areas that will be critical to future success.

- Technology to manage services levels is only a starting point, as much attention needs to be paid to the processes that support SLM tools, as well as the people who use them. Top-notch negotiating skills and well-defined processes will provide as much toward success as the latestplatform.
- SLAs are a critical weapon in ensuring that external service providers deliver what you need. However, they are not artillery to be used during battle, rather they are blueprints for a mutually advantageous relationship.
- Internal SLAs can not only fend off unfair user criticism, but can increase the respect for network performance with regular reporting of key metrics to user organizations.
- Reported metrics are only as useful as the business capability they reflect. Customer satisfaction is defined by the end-user community. Identifying metrics and setting performance levels for those metrics represents a key process development need in the IT industry.

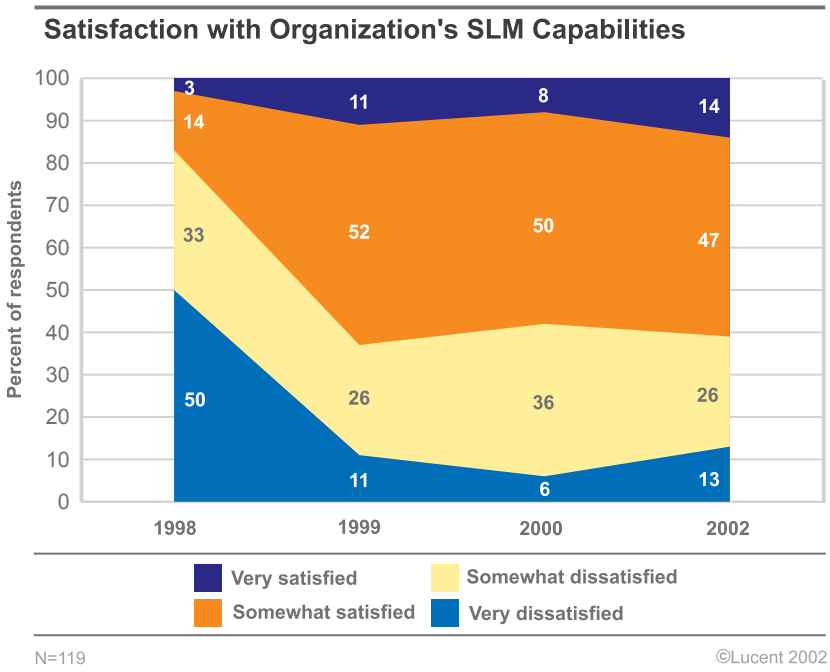
Importance and Satisfaction with SLM

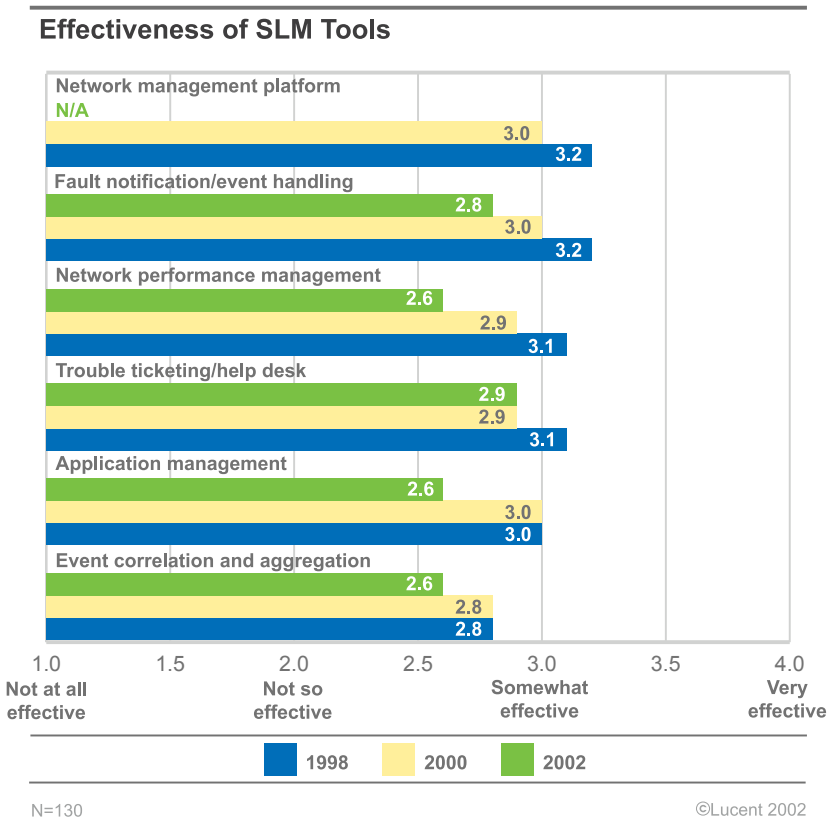
Of the 119 respondents whose organizations have service level management capabilities in place (15 respondents currently do no have SLM for their networks), 61 percent are satisfied with those capabilities. This figure represents a status quo, with satisfaction levels basically unchanged since 1999.

Looking at this from the other perspective, dissatisfaction with SLM is relatively widespread, ranging from 37 percent to 42 percent of respondents over the last three surveys. Improving SLM is a combination of tools, processes, and people, and clearly one or more of these areas is failing to improve enough to help these network professionals meet their SLM goals.

On the tools side, there is a decided increase in how respondents view the effectiveness of four of the six tool categories measured. Network management platform, fault notification/event handling, network performance management, and trouble ticketing/help desk tools all jumped 0.2 points on the effectiveness scale. Application management and event correlation and aggregation scored the same as in the survey in 2000.

Although effectiveness of SLM tools is up, satisfaction with the SLM capabilities of network and systems management (NSM) tools is unchanged over the last year. So, despite perceived increases in tool effectiveness, the impact on satisfaction levels has been minimal, if at all.



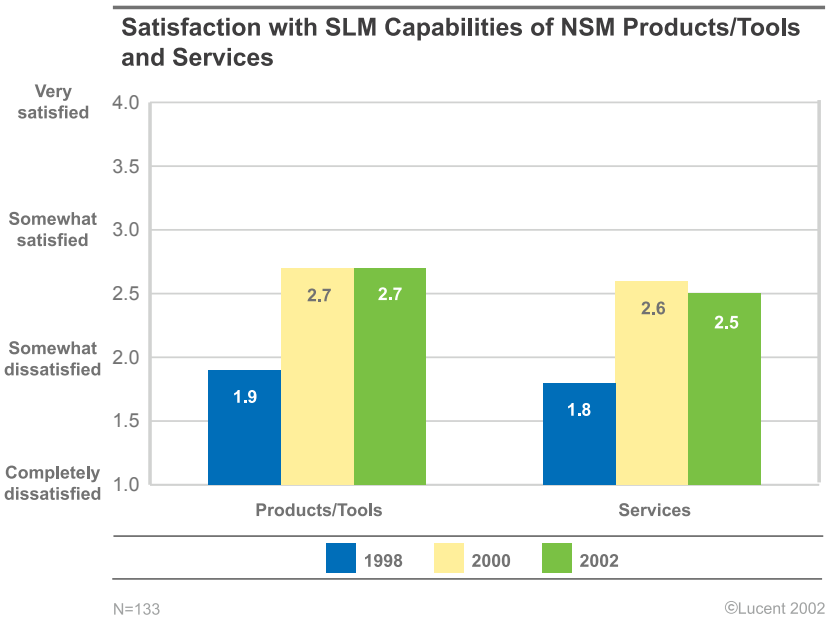


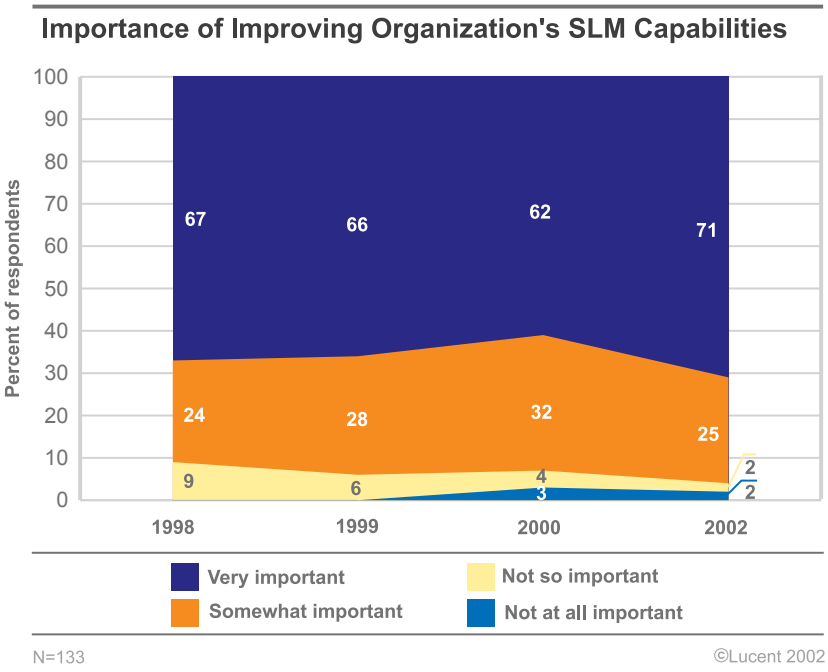
The story for satisfaction with SLM capabilities of NSM services is about the same as for tools, with the change from 2000 to 2002 being negligible. An increasingly complex network environment may account for the continued low satisfaction scores, despite the increasing effectiveness of the NSM tools to perform SLM functions. However, the bottom line for tool and services vendors is that they still are not meeting the needs and expectations of many users.

The need for more effective SLM tools is evident in the continued importance of improving their organizations' SLM capabilities as expressed by respondents. This year, nearly all respondents (96 percent) say that improving SLM capabilities is important, and nearly three quarters call it very important. This is has been a consistent result since 1998, indicating the visibility of network service levels in most enterprises, and the continued need to better manage those service levels.

Looking at the importance of various components instrumental in measuring SLM, the importance of each is rated significantly higher this year than in the 2000 survey with only a few exceptions.

The most important component for measuring network service levels is availability, which scores a 3.9 out of 4.0 on the importance scale this year, as compared to 3.7 in 2000. Eighty-eight percent of respondents describe network availability as a very important component for measuring SLM, up from 80 percent in 2000.

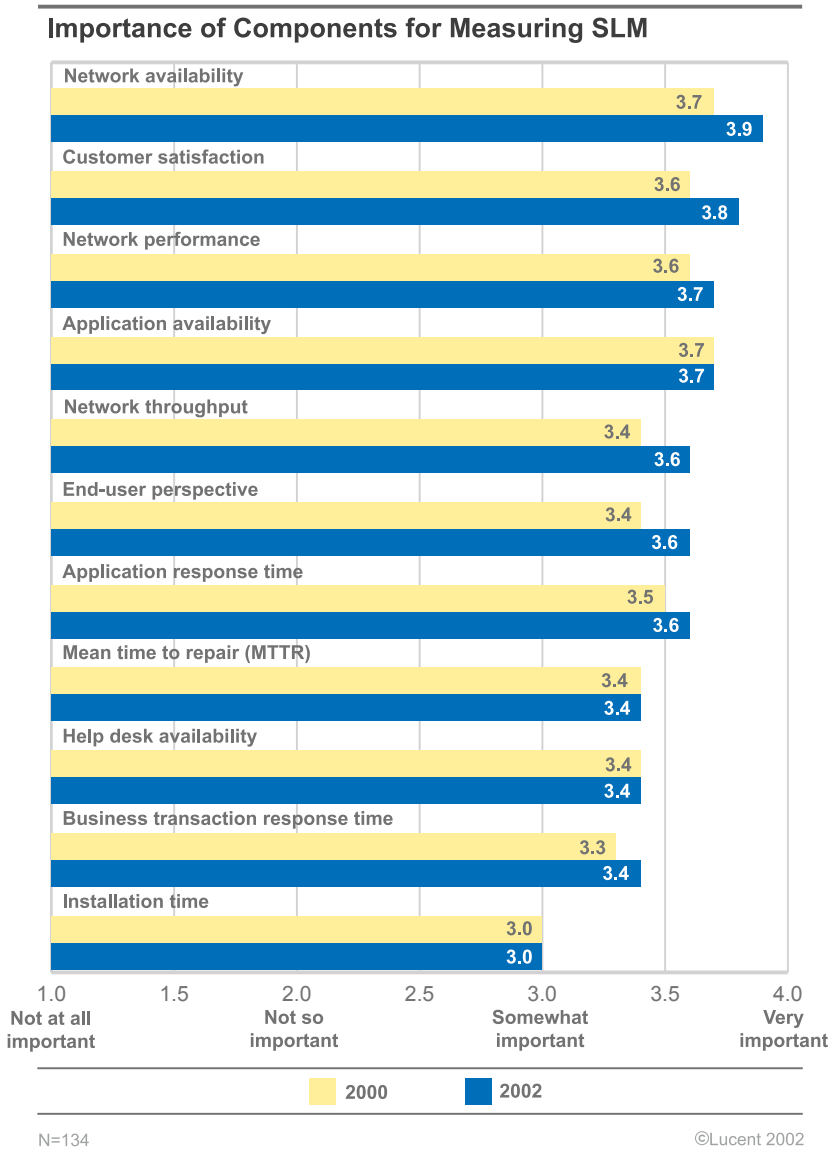




Customer satisfaction also increased significantly to a 3.8 rating, and is also deemed very important by 83 percent of respondents. Similarly, end-user perspective jumped in importance from a 3.4 rating to a 3.6 rating. These ratings indicate a greater emphasis on understanding and monitoring perceived performance, not just technical indicators.

Rounding out the top four components for measuring SLM are network performance and application availability. Although application availability remained at the same importance rating as in 2000, application response time increased from 3.5 to 3.6.

The most important component for measuring network service levels is availability...



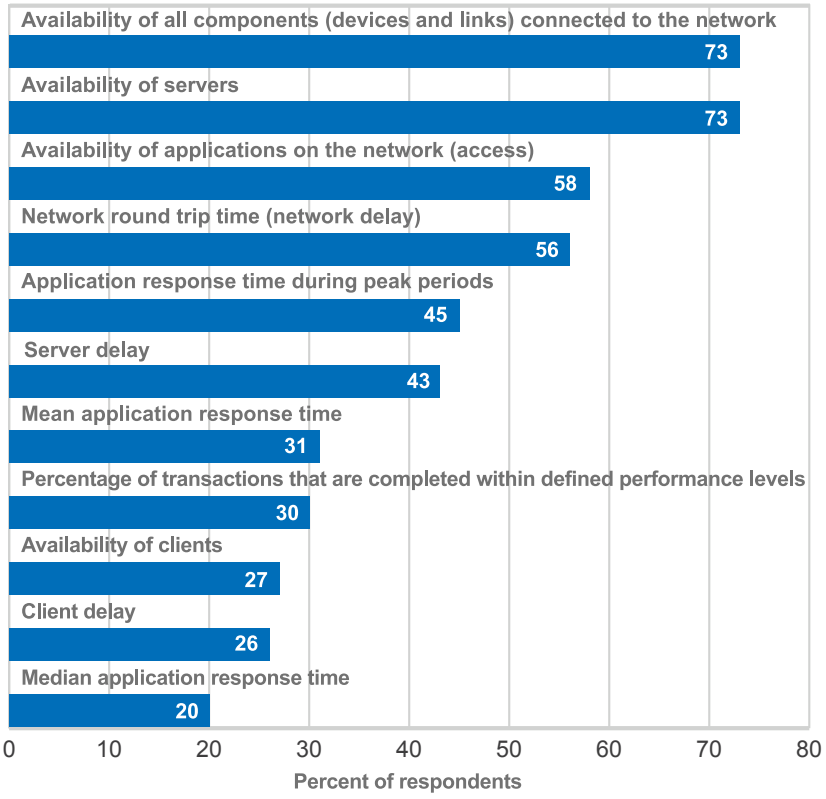
With network availability and network performance representing two of the top three components for measuring SLM, we asked respondents which metrics they use to define and measure these critical components.

Two metrics are mentioned by the large majority of respondents: availability of all components connected to the network and the availability of servers. Both of these metrics are used by 73 percent of respondents.

Two other metrics that are used widely are availability of application on the network (58 percent) and network round-trip time (56 percent). These four metrics were ranked in the same order of usage in the 2000 survey.

Among the remaining metrics, all are similar in usage to the 2000 survey.

Metrics Used to Define and Measure Network Availability/Performance



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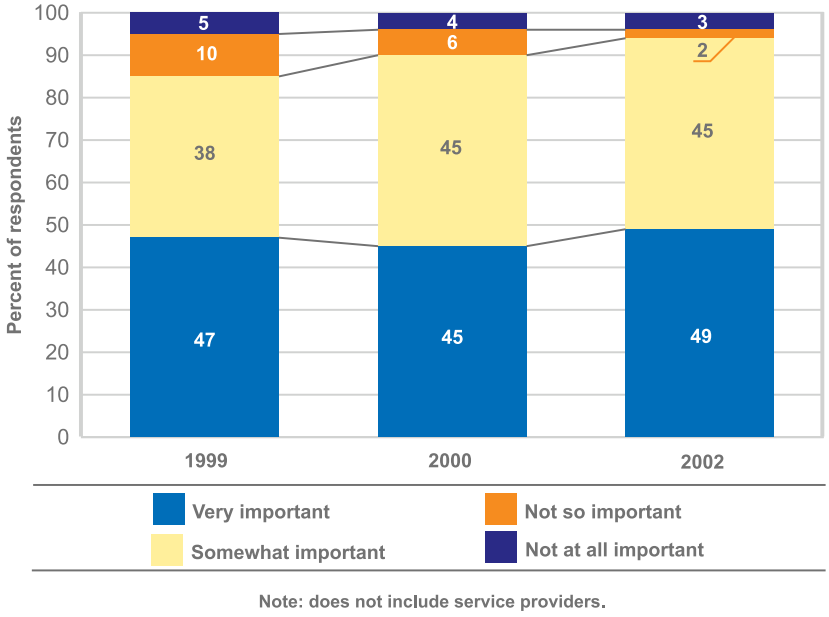
The Role of SLAs in SLM

Service level agreements (SLAs) have become an important tool in IT's efforts to define and maintain network service levels when acquiring network resources from external providers. In fact, in this year's survey, 94 percent of respondents deem competitive SLAs as important in the process of selecting a network service provider. This percentage has increased steadily since 1999, to the point where it is now almost universally expected when acquiring network services.

In order to be competitive, external service providers need to understand the objectives IT organizations have when providing SLAs linked to their services. We asked enterprise respondents to choose their top three objectives for developing SLAs with external service providers from a list of 11 possible objectives. Two objectives rose to the top of the list, well ahead of the others. For more than half of respondents, defining required services levels is one of their three top objectives. For nearly as many respondents, measuring the quality of service is also among the top three objectives. These two objectives also headed the list in the 2000 survey.

After defining and measuring services, other objectives come into play, such as mapping resources to the most critical applications and services, managing user expectations, and then measuring satisfaction.

Importance of Competitive SLAs in Network Service Provider Selection Process



Note: does not include service providers.

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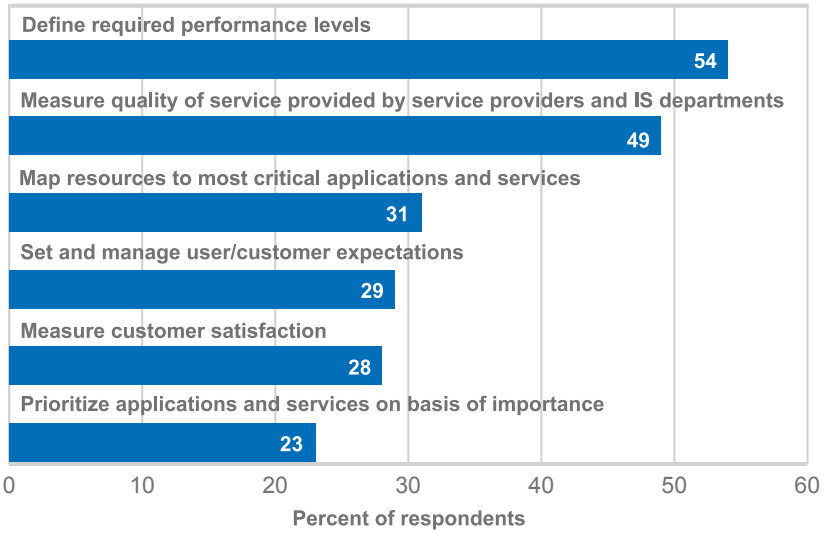
Top Objectives for Developing SLAs with External Service Providers



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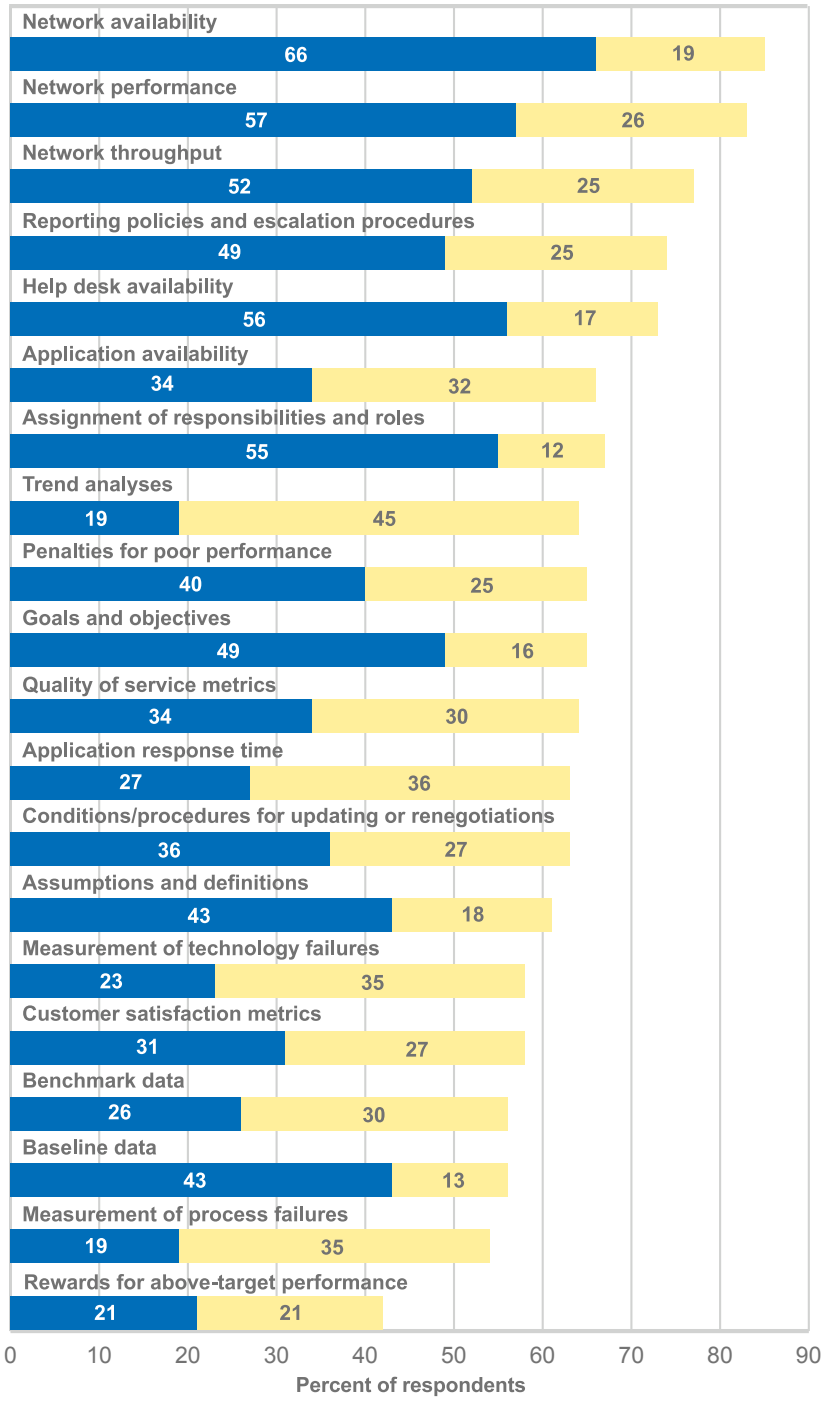
To meet their SLA objectives, respondents include a wide range of elements in each SLA. Most commonly included in these SLAs today are network availability, network performance, help desk availability, assignment of roles and responsibilities, and network throughput – all of which are include in more than half of respondents' SLAs.

Several other elements that are not frequently part of current SLAs will be added to new SLAs in the coming months. These elements include trend analyses (45 percent), application response time (36 percent), measurement of technology failures (35 percent), measure of process failures (35 percent), and application availability (32 percent).

From these figures, it is clear that IT organizations see SLAs as an increasingly important tool in their efforts to manage service levels from external service providers.

Most commonly included in SLAs today are network availability and network performance…

Elements Included in SLAs with External Service Providers



Note: does not include service providers.

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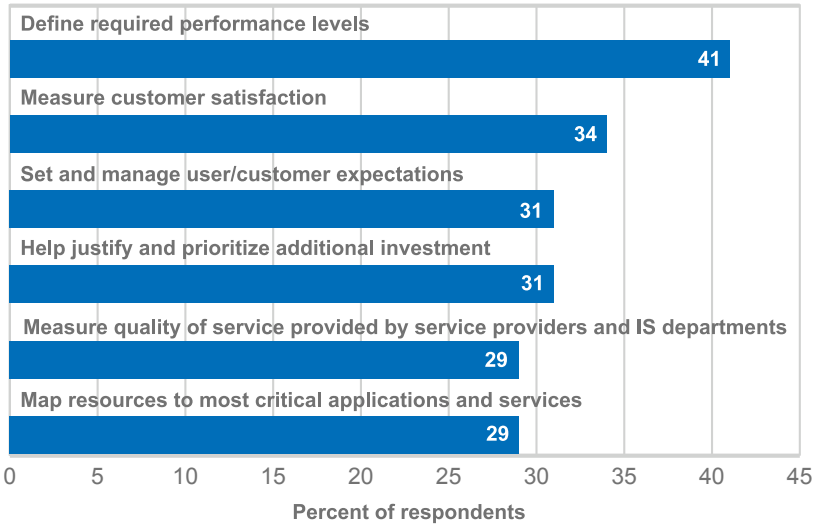
IT organizations don't develop SLAs for the sole purpose of managing network services from external providers. They are also used to set expectations and manage services delivered to internal users. When developing these internal SLAs, the top objectives are somewhat different than those for external services.

Defining required performance levels is still the top objective for both external and internal SLAs. However, measuring customer satisfaction, which is only the fifth objective for external SLAs, is the second most important for SLAs with internal users. Other differences also appear in terms of order of importance for various objectives, a reflection of the many uses of SLAs.

Top Objectives for Developing SLAs with Internal Organizations



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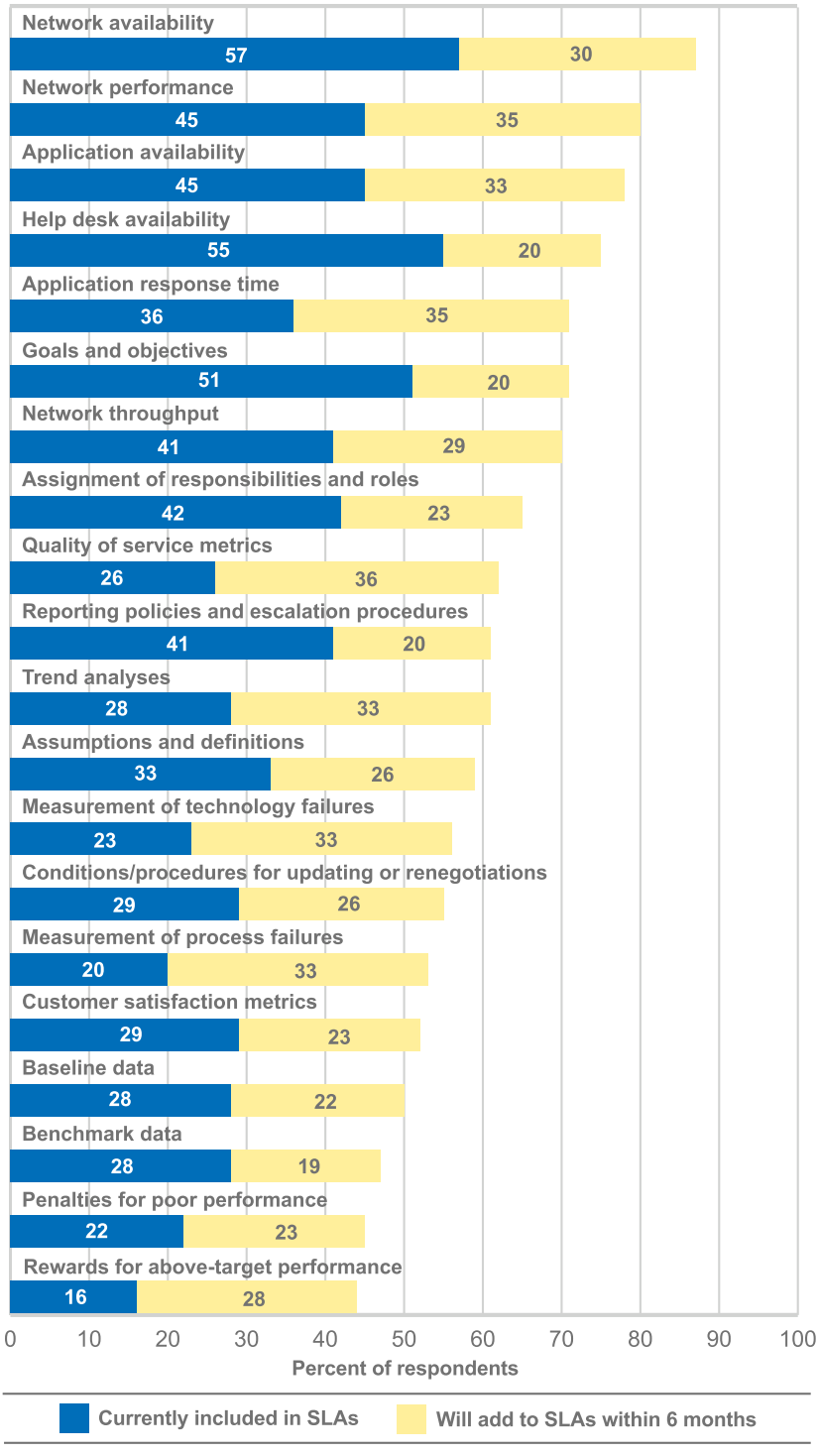
Elements included in SLAs with internal organizations also have many similarities to those with external service providers, but there are also clear differences. For instance, both most often have network performance and network availability as elements, but application availability is much more likely to be included in current SLAs with internal organizations.

Elements Included in SLAs with Internal Organizations



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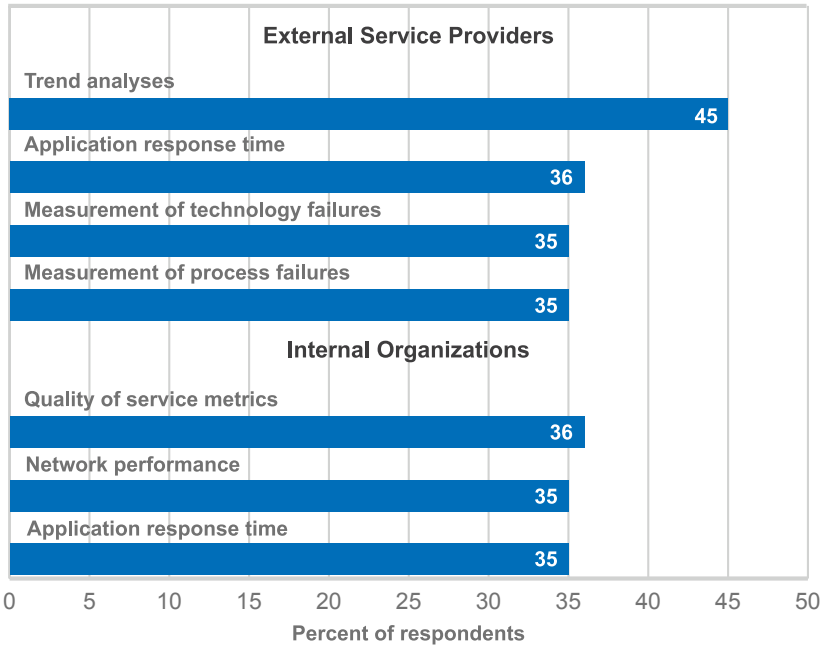
Like SLAs with external service providers, application response time is one element that will be included in SLAs much more frequently in the coming six months. Interestingly, network performance, although one of the top elements in current SLAs, will also be added to new SLAs with greater frequency. Rounding out the top three elements to be added to SLAs in the future is quality-of-service metrics.

Enterprise respondents currently have an average of 3.5 SLAs in place, although nearly half still do not have any at all.

... application response time... will be included in SLAs much more frequently in the coming six months.

Top Elements to be Added to SLAs within Six Months



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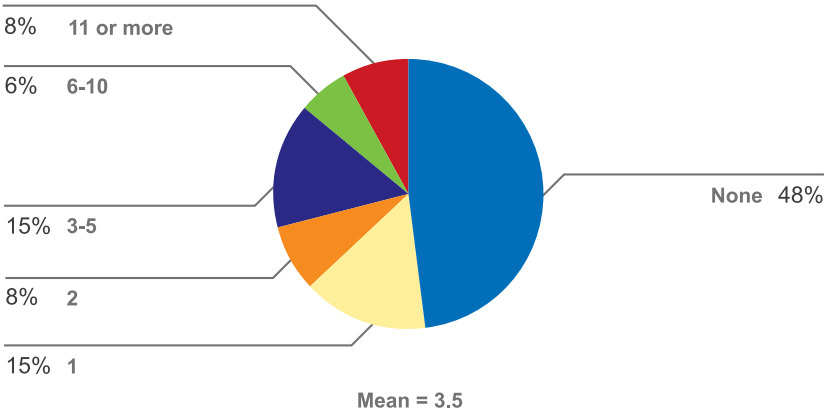
Number of SLAs Currently in Place



Note: does not include service providers.

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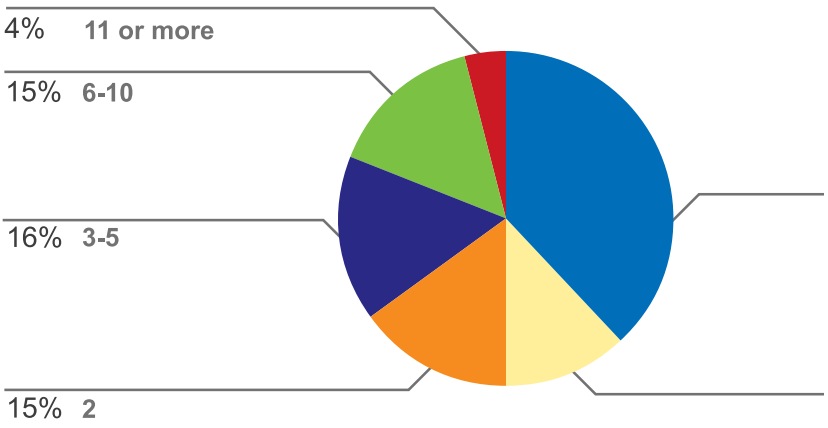
Over the next six months, more than half of respondents who do not currently have an SLA in place will implement at least one. Overall, respondents expect to add another 3.5 SLAs, and only 38 percent will have none at all.

Number of SLAs Planned to be Implemented in Months



Mean = 3.5

Note: does not include service providers.

N=68

Reporting for SLAs

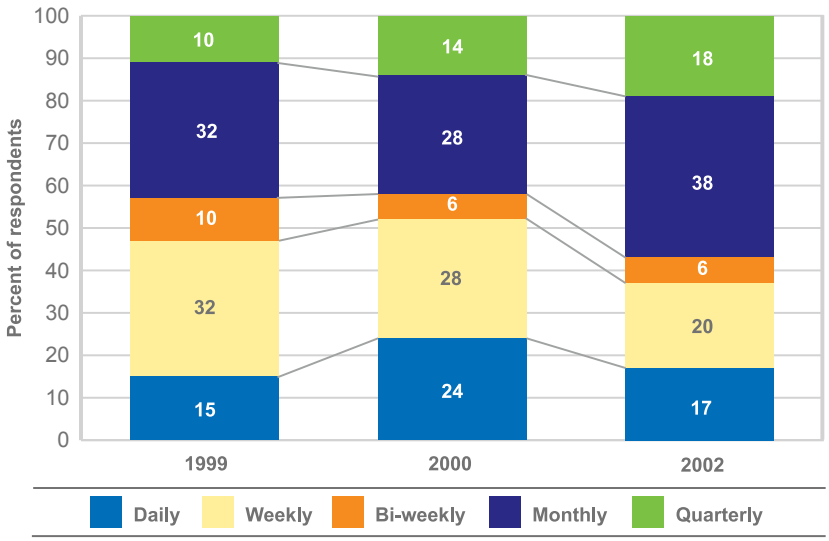
Once an SLA is established, performance against the various elements specified in the SLA must be reported regularly. Without these reports, the SLA is ineffective, since there is no way to monitor actual performance against the stated goals.

SLA status and activity reports can be generated through manual processes or from automatic processes. Of the respondents who provided information on manual reporting, 86 percent create manual reports at least quarterly. The largest plurality (38 percent) create reports on a monthly basis, while only 17 percent do so daily, and 20 percent weekly. These latter two percentages are down significantly from the 2000 survey, while the percentage of respondents creating reports only quarterly reports is higher. Undoubtedly, the staff time and effort required to create manual reports is a factor in their decline during a period when staffs have been cut to the bone.

Surprisingly, during a period when the frequency of manually generated reports has decreased, so too has the frequency of automatically generated reports. This year, only 57 percent of automatically generated reports are produced daily or weekly, compared to 64 percent in the last two surveys. However, this is still significantly higher for these reports than for manually generated report of the same frequency.

Automatic generation of status and network activity in support of SLAs is still the best hope for the future for monitoring and enforcing of SLAs with external service providers, as well as providing services to internal constituencies.

Frequency of Manually Generated Status/Activity Reports in Support of SLAs



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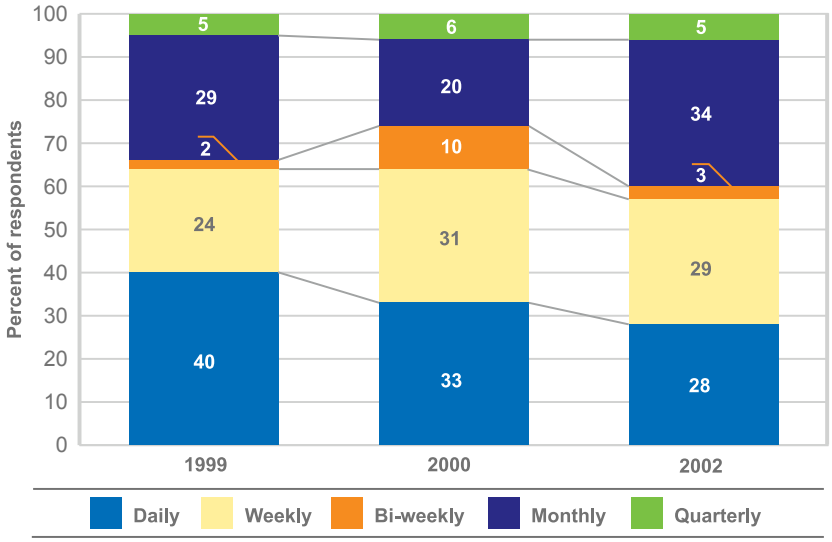
Frequency of Automatically Generated Status/Activity Reports in Support of SLAs



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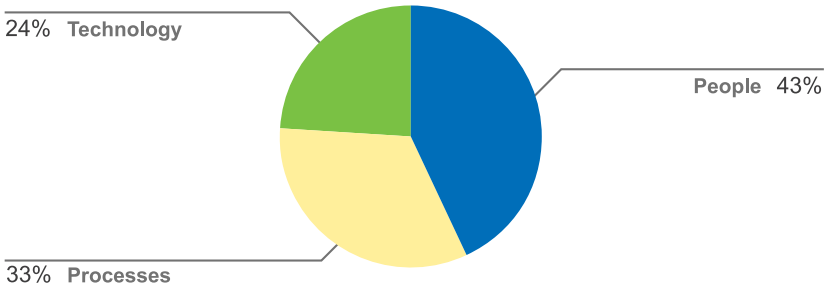
Implementing and Improving SLM

Previously we reported that nearly all respondents (96 percent) view improving their organizations' SLM capabilities as important. However, reaching that lofty goal can be a difficult climb. The factors that challenge network professionals are not just technical, but involve every aspect of building and operating networks in highly interdependent organizations.

For the largest portion of respondents (43 percent), the biggest challenge to implementing and/or improving SLM is not technological at all. Instead, people issues, such as training, workflow, and role definition, are far more often the number-one concern. In fact, technology is not even the second most frequent challenge. Rather, processes, such as troubleshooting, escalation, and documentation, take the second slot, being the biggest challenge for one-third of respondents.

Area that is Biggest Challenge to Implementing and/or Improving SLM



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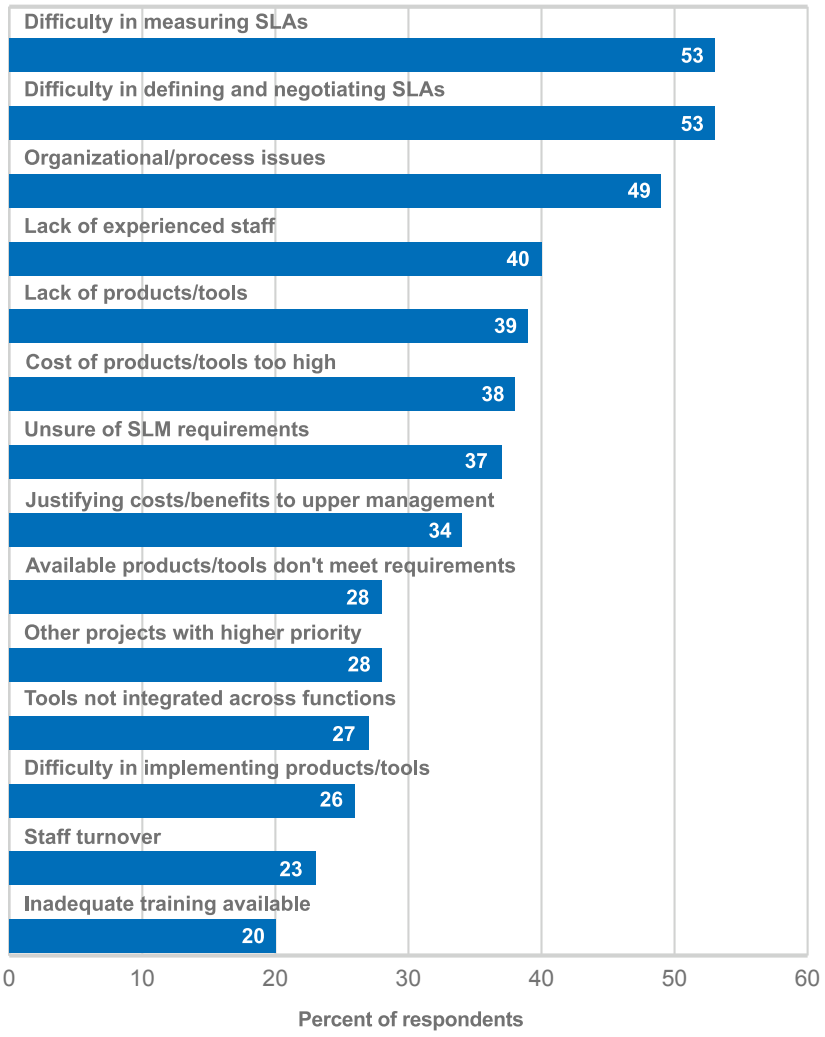
Clearly, network managers need to be more than technologists to achieve their SLM goals. They also need to be good people managers as well as knowing how to set up effective processes.

SLAs are at the top of the list of barriers to implementing or improving SLM for respondents. Like the results in the 2000 survey, difficulty in measuring, defining, and negotiating SLAs are most often identified as barriers. Note that overcoming these barriers is not simply a technological issue, rather it requires good people (negotiation) and process (defining) skills also. This leads directly into the third most frequent barrier: organizational and process issues. Putting these barriers all together paints a picture of a network manager who needs multiple skills to be successful.

Technology can present barriers also. Lack of experienced staff to implement SLM technologies is a barrier for four out of ten respondents, while lack of products and tools to meet their needs is a barrier for nearly as many. The high cost of currently available products and tools is a big barrier also.

Compared to the 2000 survey, the order and relative frequency of all 14 possible barriers is quite similar. The last two years have not shown any marked improvements for network professionals (except in the area of tool integration across functions) as they continue to manage service levels in a very challenging and dynamic environment.

Significant Barriers to Implementing or Improving SLM



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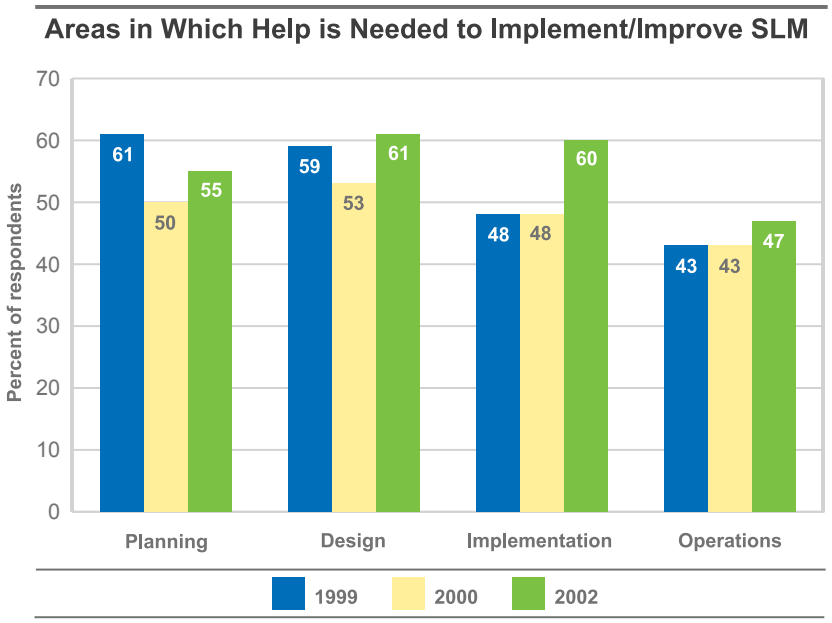
Given the multiple challenges and barriers facing network professionals, nearly 90 percent of respondents indicate that they can use help with their SLM efforts in one of more areas of the network lifecycle. Most often, respondents need help in design and/or implementation of SLM capabilities. But more than half of respondents can use help with planning, and 47 percent need help with SLM operations.

These results are similar to surveys in 1999 and 2000, with the exception of the implementation phase, which jumped more than 10 percent in this survey. This could well be a reflection of the fact that more network organizations have moved to this latter stage of the lifecycle since 2000, reflecting a higher need for assistance as they work through problems and issues.



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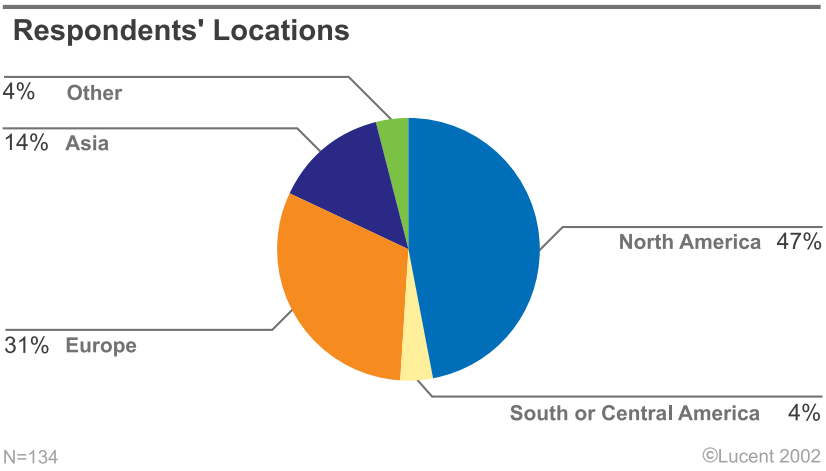
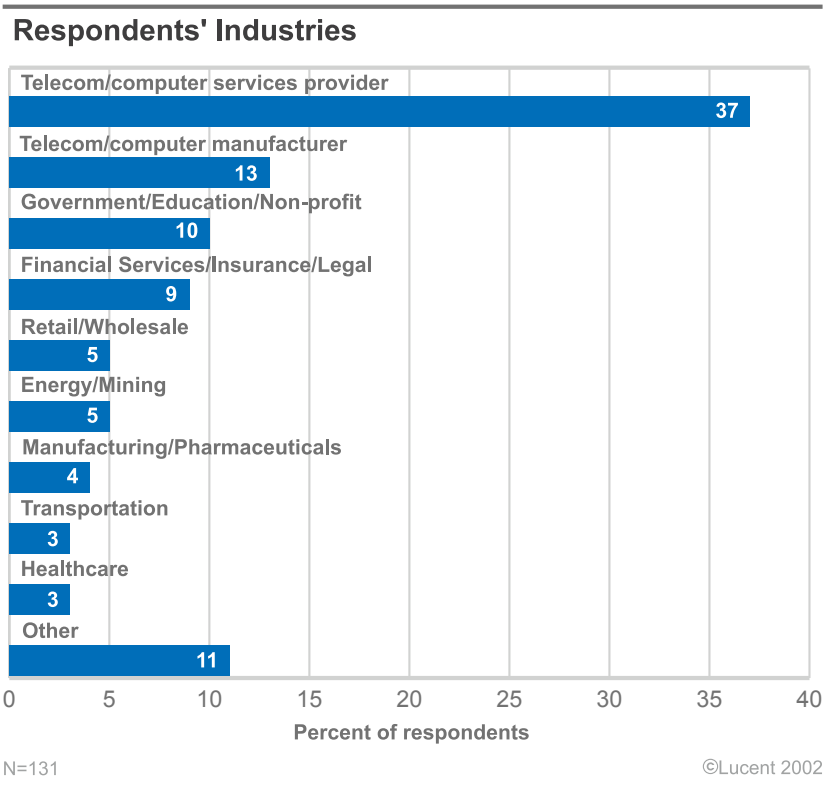
Respondent Demographics

Forty-seven percent of respondents are located in North America, followed by Europe (31 percent), Asia (14 percent), and South and Central America (4 percent). Australia, Africa, and the Middle East account for the locations of the remaining respondents.

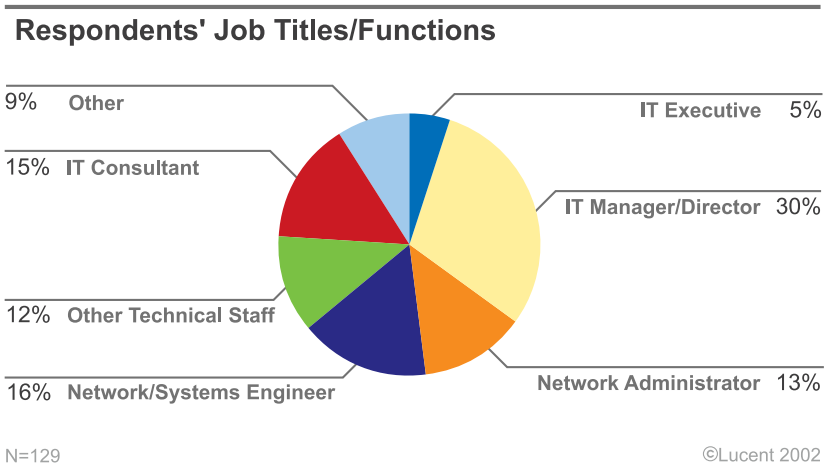
Survey respondents represent a fairly broad cross section of industries, led strongly by telecommunications/ computer services providers, which represent more than one-third of respondents (37 percent). Other well-represented industries include telecom/computer hardware and software manufacturers (13 percent), government/education/nonprofit organizations (10 percent), financial services/insurance/legal firms (9 percent), retail/wholesale (5 percent), and energy/mining (5 percent). Other industries include publishing, construction, and advertising.

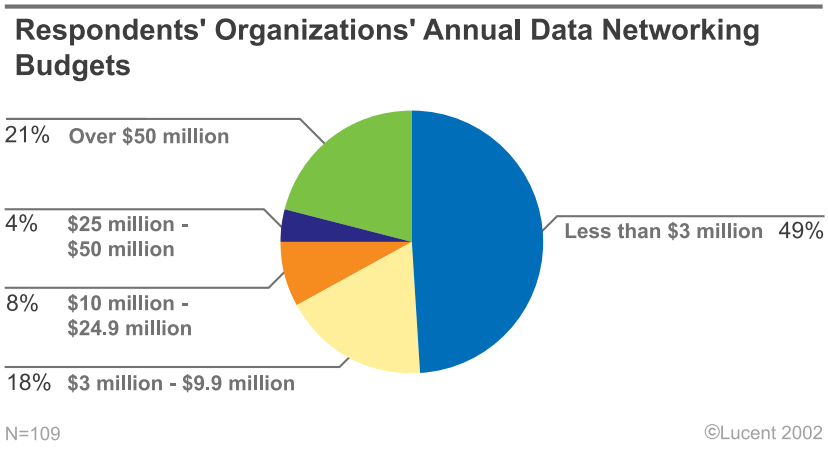




The highest percentage job title/function category is IT manager/director (30 percent), followed by network/systems engineer (16 percent), network administrator (13 percent), and IT consultant (15 percent).

At the high end, one-quarter of respondents' companies budget in excess of $25 million annually for data networking. Approximately half of respondents' companies work with budgets of under $3 million.





Respondent Comments

Service Level Management

- *Service Level Management is typically used by IT shops to provide a mechanism to justify their existence, rather than responding to customer satisfaction. I believe that customer satisfaction should be the number one goal of ANY service level process. Tooling must be in place to be able to individually identify a failure, rather than the current AVERAGE-response-time-by-month philosophy. One customer with a poor perception of response time can cause major disruptions of customer satisfaction.*
- *SLM is a complicated end-to-end process, which depends on many factors, such as QoS (which lacks a) unified standard.*
- *We see the ability to measure the service holistically as a large benefit. As outsourcing continues, we see the delivered results as a primary method of measure, not product up and down indications.*
- *For SLM, you need cut and paste solutions.*

Service Level Agreements

- *A big problem with SLAs is (when) an Administrator will not settle for less than is possible. Half measures and sloppy techniques do not satisfy.*
- *Experiences in trying to accomplish SLAs have resulted in a very negative feeling.*
- *An SLA is useless if a customer doesn't want it, because they can (often) get better/more than what an SLA as a fixed contract will get them.*
- *An SLA is very important for service provider, but not all service providers recognized it! When multimedia services on the Internet grow up, SLA becomes more and more important for ISPs. Specifications about SLA, such as frf.13, TMF/SLA management handbook and so on, are not enough for developing SLM for service providers.*
- *SLA/SLG/SLM tools are very immature. Having seen three demos and one set of slides on planned tools, none are mature or fully functional or ready for implementation in a large telco.*

Methodology

This survey was conducted over the World Wide Web from December 1, 2001 to January 18, 2002 at: **http://www.lucent.com/contact/current_survey.html**

All Web survey responses were automatically collected into a survey tool. Any questions skipped or incorrectly answered by survey respondents were not included in the tabulations. Not-applicable responses were also not included in the tabulations. Each chart includes the number of valid responses for that particular question (e.g., N=100 indicates 100 responses). Percentages shown in charts may not equal 100 percent due to rounding.

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