Chapter 4
IT Infrastructure: Hardware and Software

Service level agreements (SLAs) are contracts between firms that formally define the level of service between a purchaser of services and a vendor of services. Contracts are a promise between individuals and firms to perform a service. Some contracts are oral agreements, while others are written documents. Some contracts are unconditional, while others have conditions. In a marriage contract, both parties promise to "love and obey, in sickness and in health" without condition or specification of what exactly is meant by "love" or "obey." In most commercial contracts, there are conditions: "in return for payment, the vendor promises to perform the specified services." In most commercial contracts, the exact meaning of "perform specified services" is defined in some detail.

Originating in the telecommunications industry to formally define the level of telephone voice service that telephone companies would provide to purchasing firms, SLAs have spread to all areas of business which involve services from human resources to marketing, management, logistics and information technology.

Service level agreements provide an opportunity for the purchaser of services to precisely specify the level and quality of service to be provided, to implement business best practices and world-class levels of service (as determined by independent certifying bodies such as the International Standards Organization (ISO), and in the IT area, the Information Technology Infrastructure Library (ITIL). SLAs are related to the payment process as well. Service level agreements provide the seller of services with clear, measurable, objectives and benchmarks which, if attained, trigger payments to the provider. SLAs also contain provisions for cost recovery and penalties for non-performance or failure to meet the benchmarks. Typical SLAs will also have provisions for termination of the contract.

While service level agreements started out as a contract among independent firms, they are also used today within firms to manage the relationship between major departments and their internal customers although in this case, because they are internal documents, these service level agreements are more "agreements" than legally enforceable contracts. For instance, a centralized corporation information systems department or unit, will often use service level agreements to govern and manage its provision of IS services to other units in the firm.

SLAs have become very important in the information technology and systems areas of business firms. As firms increased their outsourcing of IT services beginning in the late 1980s, SLAs became the primary management tool for governing the relationship among the parties. Increasingly firms do not build their own software, but instead purchase the software from vendors. This purchased software generally requires a large consulting service and support component to implement, operate and maintain the software. Service Level Agreements are used here to specify and manage the process. The emergence of software as a service, especially a Web service, has also spurred the development of service level agreements. As more business software moves to a Web delivery platform, SLAs are the primary tool regulating the relation-

ship between vendor and purchaser of software services. Increasingly, in an out-sourced and Web-based software world, SLAs are the glue that holds the outsourcing process together and provides managers for both purchasers and vendors with objective guidelines for performance and payment.

INFORMATION SYSTEMS SERVICE LEVEL AGREEMENTS

In the information systems world, service level agreements cover a very large variety of IT services provided by outside vendors.   Firms use SLAs in the systems area for several reasons:

- Identify and define the customer's needs
- Provide a framework for mutual understanding
- Provide a framework for charging and pricing services
- Simplify complex issues
- Reduce areas of conflict
- Encourage dialog in the event of disputes
- Eliminate unrealistic expectations
- Provide a framework for competitive bidding of services

The table below lists some of the most common services governed by service level agreements and a very brief description of one or two metrics used to evaluate the "level" of service. For instance, one way to measure the quality of service at a help desk is to calculate how long on average does it take for a help desk technician to return a user's call for help.

TABLE 1   Common Services Governed by Service Level Agreements

SERVICE	SERVICE LEVEL EXAMPLES
Service Desk	Average response time
Hardware support	Processing speed; transaction cost
Software support	Version control
Software maintenance	Hourly charges for routine changes
Software development	Cost for new functions
Server support	Hourly charges for server operations
Data network service	Network uptime
Voice network service	Maximum voice capacity
Data center service	Transaction costs; energy costs
Web site operations services	Web page delivery capacity
Security levels	Risk analysis and security cost
Disaster recovery services	Costs for remote backup sites
Dispute resolution	Costs and speed for resolving disputes among parties

SERVICE LEVEL AGREEMENT ISSUES

While service level agreements are one of the major tools for governing the relation-ship between the purchaser and providers of service, they have many limitations and pitfalls as well. Two of the most common pitfalls involve incomplete contracts and information asymmetry, but there are other issues as well.

Incomplete contracts. Some important aspects of a relationship cannot be described in a contract. Contracts are never complete in the sense of defining every possible contingency and state of affairs in the world. Because it would be impossibly

complex and costly for the parties to an agreement to make their contract complete, the law provides mechanisms called default rules which fill in the gaps in the actual agreement of the parties. In cases of disagreement, for instance, the contract may require the dispute be settled by an arbitrator rather than other legal remedies.

Information asymmetry. In most contracting situations, the participants have unequal amounts of information. Typically, the vendor of a service knows much more about the costs of providing the service than does the purchaser because they are specialized on this service and have many years of experience. Moreover, the purchaser quite often knows very little about their own internal costs for providing the service. The vendor is incentivised to use this information disparity to extract additional profits. While having multiple vendors bid on providing services to a firm is one theoretical solution, in practice most firms choose from a much smaller list of providers who have a keen understanding of the "market price" for services, or who have a track record of performance in previous contracts. Therefore, service level agreements for service outsourcing can be more costly than providing the service from internal sources.

Managing complexity. Contracting costs. There is a cost to all contracts. Large scale service level agreements, say above $10 million, can become quite complex. Some of the largest SLA contracts go above $100 million. The SLA itself becomes a very complex, long document which requires teams of managers on both sides to create, and then manage. Indeed, software firms have sprung up to provide SLA creation templates, and online management tools to ensure the thousands of performance standards in large contracts are in fact being met. Contract management costs rise precipitously with the size of the contract.

Enforcement costs. Termination costs. When parties fail to perform, it can become very expensive to terminate the contract and even more expensive to allocate damages. When the vendor fails to perform, the purchaser has to either replace the vendor with another, or hire employees to have the service performed. In the meantime, the business can lose millions of dollars in revenue, or experience extraordinary costs. Establishing the size and nature of the damage requires teams of lawyers, a lengthy litigation period, and other unforeseeable costs.

REFERENCES

There is a very large literature on contracts and service level agreements. Here are just a few references to get started:

Jacques Bouman, Jos Trienekens, Mark Van der Zwan, "Specification of Service Level Agreements, Clarifying Concepts on the Basis of Practical Research," step, p. 169, Software Technology and Engineering Practice, 1999.

Nathan J. Muller, Managing Service Level Agreements, International Journal of Network Management, 9, 1999.

Jos J.M. Trienekens, Jacques J. Bouman and Mark van der Zwan, "Specification of Service Level Agreements: Problems, Principles and Practices," Software Quality Journal, Vol. 12, 1, March 2004.