Texas Instruments Incorporated: Service Level Agreements and Cultural Change

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Title: *Texas Instruments: Service Level Agreements and Cultural Change*

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Abstract: The Information Systems and Services (IS&S) unit at Texas Instruments had a reputation for providing high quality, state-of-the-art systems to the company's individual business units. IS&S found that its centralized structure contributed to a standardized and highly reliable global infrastructure but made it difficult to respond to the firm's increasingly dynamic market environment. In the late 1980s IS&S started distributing staff to the business units to increase communication and to enhance understanding of business requirements and IT capabilities. Global cost pressures and the need for an enabling infrastructure demanded even more proactive efforts to target IS&S products and services at strategic business needs. In this case study the firm is preparing to implement service level agreements for this purpose. The case study identifies design and implementation issues key to the success of its service level agreements.

26 pages

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Introduction

In December 1996, Jodie Ray, then CIO of Texas Instruments Incorporated (TI) reflected on the firm's upcoming introduction of service level agreements. He noted that SLAs represented another step in his efforts to increase the strategic impact of the firm's core IT services. He hoped that the SLAs would foster two-way communication that would promote mutual understanding of how the IT unit could best add value to the organization and would lead to support for a shared infrastructure:

> We started reengineering IT in 1994 but we struggled with how to partner with the businesses. We needed a good communication tool. Service level agreements help business people articulate their needs and they focus IS&S [Information Systems and Services] on returning business value.

The schedule for designing the SLAs and the accompanying reorganization of the IS&S unit had been compressed to meet a January 1, 1997, implementation deadline, so he expected some bumps in the process. Ray wondered about the impacts of the agreements. Would they lead to greater customer intimacy? Would they foster support of a shared infrastructure? Would they identify opportunities for cost reduction? As he prepared for a meeting of his management team, he wanted to determine what actions were necessary in both the month remaining before implementation and the first year of the agreements to ensure the success of the SLAs.

Background

Founded in 1930 as Geophysical Service Inc., Texas Instruments Incorporated (TI) adopted its name in 1951. From its beginnings as the first independent contractor specializing in the reflection seismograph method of exploration, TI became a leading producer of high-technology products world-wide. By 1996 TI operated out of 155 locations in 33 countries, including 42 manufacturing plants in 16 countries. It employed 59,500 employees worldwide, of which 35,000 were in the U.S.

Over the years, TI built a reputation for product innovation and high-quality manufacturing operations. Among its innovations were the commercial silicon transistor, the integrated circuit (IC), the electronic hand-held calculator, and DMD (digital micromirror device) technology for imaging applications. Quality awards received by TI subunits in Taiwan, the United Kingdom, Singapore, Malaysia, Japan, Portugal, Canada, and Germany, as well as a Malcolm Baldrige award in the U.S. (1992), and the European Quality Award in 1995 attested to the firm's emphasis on quality processes.

In its 1995 annual report, Texas Instruments declared a goal of "world leadership in digital solutions for a networked society." TI pursued this goal through development of products that enabled key networking capabilities, such as signal processing, mobile computing, wireless communications, and digital imaging. Semiconductors comprised approximately two-thirds of TI's revenues, but the firm was diversified into related areas that were both profitable and growing. These included defense systems, notebook computers and calculators, materials and

controls, and emerging technologies like digital light processing and object-oriented business software.

TI experienced its best financial performance ever in 1995, with total revenues exceeding $13 billion and profits topping $1 billion for the first time in TI's history. (See Exhibit 1 for a summary of TI's financial performance.) In 1996, however, the semiconductor industry experienced drastic reductions in profit margins due to excess customer inventories. Average DRAM (Dynamic Random Access Memory) prices fell 80% from the third quarter of 1995 to the third quarter of 1996, cutting TI revenues and profits to well below those of a year earlier. TI responded to what industry analysts believed would be a temporary crisis by making productivity improvements. As part of its cost-cutting efforts, management offered an enhanced voluntary retirement program to about 5300 eligible US-based employees effective December 31, 1996. It also accelerated the pace of execution of its company strategy with targeted acquisitions, divestitures, R&D and capital expenditures for wafer fab expansion, and new construction.

Information technology at TI in the early 1990s: Product Innovation

TI's information technology unit had traditionally been centralized, staffed with as many as 2500 IT professionals who developed state-of-the-art systems in support of TI's global business operations. In the 1980s and early 1990s, Information Systems and Services (IS&S) was organized around major technologies and technical processes. (See Exhibit 2 for a 1992 organization chart.) At the time, it relied solely on proprietary software, even developing its own e-mail system before commercial systems were widely available. In order to recover the costs of its investment in developing leading-edge software and to leverage its technical competence, TI sold some IS&S products, including its CASE-based methodology, externally.

IS&S enhanced its competence through extensive training in technologies, leadership, quality, and methodologies delivered by a staff of as many as twenty-five full-time educators within IS&S and supplemented by external specialists. A professional development center worked with individual staff on self-assessments and career progression. TI became recognized as having an outstanding IT organization and was regularly included in lists of firms that were most effective in their application of IT[1]. Dan Murphree, Director, Business Alignment, later observed that its technical accomplishments created an atmosphere of pride and self-reliance within IS&S:

> We have twenty years experience with a common, standards-based global WAN with a single global interface and 65,000 terminals sending and receiving e-mail messages in sub-second response times. We produced our systems in-house because the vendors were too slow. (Dan Murphree, December, 1996)

As a centralized unit, IS&S had perceived itself as a vendor whose goal was to "do the right thing" for its internal customers. Senior management established the IT budget, but IS&S management determined IT priorities, made resource allocation decisions, and then billed internal users to recover its costs. This model fit TI's business environment throughout the 1980s, when its businesses were stable and synergistic. The new decade, however, brought

[1] See, for example, "All for the Best," *CIO*, August 1995, pp. 26–30, and "Charged with Change," *InformationWeek*, September 1995, pp. 100–104.

changes in politics (particularly the fall of the Berlin Wall, which contributed to reduced defense spending) and markets (most notably the shift from commodity to differentiated semiconductor products). TI responded with major business initiatives that included joint ventures, acquisitions, divestitures, and process reengineering. These initiatives, in turn, created very different and more varied demands for IT support within the firm:

> We had excelled at innovation and product leadership and suddenly the business demanded greater customer intimacy. We needed to abandon our one-size-fits-all approach and provide business-targeted IT. (Jodie Ray, CIO, 1996)

Evolution of the IT-Business Unit Partnership

Operating in a CIO mandate approach with its internal customers limited the need for IT-business interaction. The CIO had met about twice a year with a senior management team that approved its budget, and development teams had regularly discussed requirements with, and provided training for, systems users. For the most part, however, IS&S staff did not communicate extensively with their internal customers, and at least some of those customers felt that the unit did not understand their needs:

> What was happening was that in a large organization, the sensitivity to business-specific needs can get lost very easily, so the large central IS&S organization, which had a tendency in my opinion to have been a dictatorship, wasn't necessarily serving the business needs. (Dennis Hallworth, Systems Manager, Materials and Controls Group)

This sense that IS&S was isolated from the businesses led to concerns by business managers that IS&S investment decisions did not focus on their priorities. Consequently, business unit managers sensed they were paying for things they did not want. Hallworth noted that IS&S delivered "limousine" solutions when a bicycle might be sufficient:

> IS doesn't understand cut lines [spending limits] from what I've seen. They don't understand that even though something might be a good thing to do, we probably can't do it this year; we just don't have the money. It might be great to do, but we're not spending the money, because we want to invest in new product development. We want to invest in new equipment. We want to invest in training. We want to invest in facilities.

IT management had recognized the need for IT-business unit communication in the mid-1980s when high-level liaisons had been assigned to business units. These business CIOs, as they were called, were responsible for eliciting business priorities and helping business unit management understand their responsibilities in systems development efforts. In 1993, a business manager was named CIO, and leadership of the software business was separated from IS&S so that the latter could focus on business unit needs. The new CIO worked to strengthen IS&S-business unit ties.

In January, 1995, Jodie Ray was brought in as CIO from TI's software business to focus IS&S on business needs and to reduce total costs. He stepped up his predecessor's efforts to gradually adopt a federal governance structure by distributing IS&S applications staff and some support staff to the business units. The distributed staff reported to the business CIOs who reported solid-line back to Ray and dotted-line to business management. Distributed staff were compensated through corporate IS&S, but their bonuses were tied to divisional performance. By 1996 only about one-third of IS&S employees were located in the central unit, and Ray believed that central staff could be reduced to as little as 25% of the total in the coming years. He was working with senior management to change reporting lines so that distributed IS&S staff would report directly to business management and have just dotted-line relationships to the CIO. (Exhibit 3 shows the IS&S organization chart in 1996.)

In addition to changing IT governance, Ray supported efforts to reengineer IS&S through the RITTI (Reengineering IT at TI) initiative. Announced in mid-1994, RITTI had four key components:

- The development of PowerPath, a TCP/IP[2] network to replace TI's existing WAN.
- A new approach to applications delivery in support of finance, sales, distribution and materials management that mandated reusing before buying and buying before building new applications.
- A new IT work environment, focused on developing technical skills and providing business and leadership training to make IS&S staff more effective in working with customers.
- IT service choice, a program offering TI businesses the flexibility to tailor their selection of IT services and service levels to meet their specific business needs.

Two years into the RITTI initiative IS&S had implemented a global TCP/IP network that had quadrupled file transfer speeds between client-server applications. It had broken with tradition to purchase PeopleSoft, SAP, and other applications packages. It had created centers of excellence designed to help individuals map out career paths and plan professional development. Finally, IS&S was preparing to implement a service choice agreement process that would provide its internal customers with choices regarding the IT services they received and paid for.

Implementing Service Level Agreements

The concept of Service Choice as outlined in the RITTI initiative meant that IS&S would adopt service level agreements as a means of negotiating, delivering, and charging for central IT services. The service level agreements signaled a change in how IT infrastructure investment decisions would be made. In the past, infrastructure investments were undertaken as necessary to support new applications, and infrastructure development costs were bundled with the cost of

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[2] TCP/IP stands for Transfer Control Protocol/Internet Protocol. It is the dominant architecture for managing distributed systems within and across organizations and can be used to connect systems provided by any vendor.

application development. Top management broke with tradition to provide the $100 million needed for the TCP/IP network implementation, because a single global user interface and reliable, high-speed data transfers were considered strategic priorities to support a range of applications and capabilities. Senior management might again consider such "speed bump"[3] investments in infrastructure, as the need arose, but most infrastructure investments would result from negotiations with business units in which business unit managers would designate which services and capabilities they wanted. In essence, infrastructure development and support priorities would be established by the business units.

IS&S had long attempted to provide meaningful information on its costs to the business units. Prior to 1995, IS&S charges were presented in great detail with as many as 2,200 line items on statements sent to each of 6,000 cost centers. The line items were based primarily on mainframe resource utilization, which was marked up to cover all overhead expenses as well as a 3% profit. (See Exhibit 4 for examples of line items.) The detailed data proved helpful to IS&S financial analysts in identifying cost drivers and recognizing potential savings from data center consolidation and other management changes. Customers, on the other hand, found the detail overwhelming:

> At the division level we had thousands of billable lines. It became meaningless; you'd end up giving up. We didn't do anything with those charges. (Business Unit Controller)

When Deneese Gipson became IS&S controller in late 1993, she believed, based on her experience as a business unit controller, that IS&S charges were high and hard to understand. She decided to "put our cards on the table" and solicit customer input to fix the chargeback algorithms. She worked with category advisory boards (CABs), comprised of business CIOs and core IS&S staff to identify major cost categories and decide on a basis for charging for them. Initially it was difficult to get commitment from individuals whose input was important:

> We have a twenty-five year history of dictatorship, and now all of a sudden we want to work *with* our customers. We've been beating up everybody on the block and now we want to play and no one wants to play. (Deneese Gipson, IS&S Controller)

The CABs distinguished fixed costs, which they felt should be allocated to divisions, from variable costs that were based on usage. The process of distinguishing fixed from variable costs increased understanding of IT costs. A new chargeback process, implemented in January 1995, reflected the recommendations of the CABs. It eliminated the mark-up for profit and pulled fixed costs out of the usage rates. The new chargeback statements had fewer than fifty line items, which distinguished between mainframe resource usage, data communications costs and development costs (both allocations based on prior year usage of system resources), and general overhead (based on prior year mainframe usage charges). Business unit managers applauded the much simpler and more understandable billing statements generated by the process, but observed that fixed allocations represented the larger proportion of their total charges.

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[3] "Speed bump" is a term used by TI and other firms to refer to "one-time" funding required to get them over a hump that was limiting their ability to provide new IT capabilities.

Those business unit managers who participated in the discussions of the charges were comfortable with how the costs were allocated, but they were concerned about high fixed costs. One business unit controller found his data communication costs had increased $2 million as a result of the reengineering of the chargeback system. He objected to the allocation, but it clarified what he was paying for, and he felt that the high IT expense was providing capabilities beyond his division's needs:

> Over time we came to realize that the decision for data communication was made by an IS&S organization in Dallas with their own concept of what growth and capacity was. Once they unbundled it and got it on our radar screen and we started working with it, we understood what we were paying for. So as they started to do that kind of unbundling, there was this reality that set in. (Paul Danesi, Vice President, Controller, Materials and Controls Group)

The new chargeback process generated interest both within IS&S and in the business units for greater business unit control over their costs. They believed SLAs were the next step in better targeting IT expenditures at business priorities. The original plan for implementing SLAs was to start with a pilot that would move just data communications (about 30% of core IS&S costs) under SLAs in 1997. As the IS&S leadership team (business CIOs and Jodie Ray's direct reports) discussed the concept, however, they noted that moving to SLAs would require some radical reorganization that precluded a pilot implementation:

> When we really got into it, we realized that just looking at data communications was still selling things, not services. If we really wanted to be true to the concept of SLA, we couldn't think in terms of data communications, but rather of supplying communications from the desktop to their destination. (Deneese Gipson, IS&S Controller)

Dan Murphree, Director of Business Alignment, headed up the effort to define the SLA process. (See Exhibit 5 for a diagram of the SLA process implementation.) The first step was to discuss with the business units what services should be provided centrally and which should be provided locally by division IS&S staff. Although some business CIOs delegated responsibility for this effort, the chargeback redesign had alerted all the business units to the importance of the business unit's participation. One business CIO who had not been active in the initial chargeback reengineering described his commitment to the SLA process:

> From a business point of view, service level agreements were extremely important to this group. And what was going to be within the core versus what was optional was, without a doubt, one of the biggest single issues from a funding point of view. I spent a year's worth of my time and a lot of flights to Dallas working that issue. (Dennis Hallworth, Systems Manager, Materials and Controls Unit)

Core IS&S staff drew up a list of 108 existing services divided into 7 categories: enterprise-level services, communications services, customer/vendor connectivity solutions, distributed com-

puting services, mainframe services, applications services, and extended services such as consulting. (See exhibit 6 for a full listing.). Division CIOs voted on each service to indicate whether they wanted it to be provided centrally for everyone, centrally for those who wanted it, or locally as the responsibility of the business unit. Only the thirty-two services that everyone agreed should be centrally provided were designated as enterprise-wide services. Eighteen (mostly applications-related) services would be turned over to the individual businesses, and the remaining 58 services would be provided by core IS&S as optional services to the businesses. IS&S mapped the 32 enterprise services and 58 optional services and their related costs into approximately 50 different services to be negotiated under the SLA process. (Exhibit 7 lists these services.)

In June 1996, business CIOs indicated their optional service needs. At the same time IS&S allocated its 1997 budget among the services to be offered by corporate IS&S based on its estimates of service level demands and its knowledge of cost drivers. Sixty percent of the IS&S budget was targeted for enterprise services. The other 40% was for optional services.

As part of the process of preparing budgets, IS&S ran simulations which calculated each business division's approximate total charges based on their initial requests. These simulations were intended to help divisions determine whether they would meet senior management-defined IT spending limits. (See Exhibit 8 for an example of the output from the simulations.) Deneese Gipson noted that the simulations provoked intense discussions about IT charges:

> It gets us in so much trouble, but it's such good conversation to have. We're telling them six months in advance what their bill will look like, so they can do something now instead of waiting and being mad about it later. Sometimes we think if we just quit doing this, we wouldn't have so much pain. But, still, it's the right pain to have. (Deneese Gipson, IS&S Controller)

Formal SLA negotiations, which specified performance metrics and cost, commenced in July (See Exhibit 9 for examples of services, metrics, and costing methods). In some cases, service owners were not identified prior to negotiations, so Dan Murphree, Director of Business Alignment, who had overall responsibility for SLAs headed up the negotiation process. For the most part, divisions could decide only whether they wanted a service or not. Various levels of service were not available for the first year of the SLAs, partly because of time constraints in preparing the SLAs and partly because in many cases IS&S did not know enough about either its cost drivers or its customers' needs to be able to package and price alternative service levels. Each service specified metrics comprised of a small number of measures (usually one to three) that indicated service guarantees. Metrics negotiations, because they took place after spending limits had been established, focused on how much IS&S thought could be delivered within the stated budget constraints. As one service owner observed:

> For some services there might be gold, silver, and bronze levels of service. Division CIOs, of course, wanted us to promise gold service; we sometimes felt we could only promise bronze for the desired budget level. (Steve Groce, Service Owner, Service Delivery)

By early December 1996, central IS&S had reorganized around its newly defined services. Approximately 35 service owners had been assigned responsibility for TI's 50 or so services. Each division had designated the services it wanted core IS&S to provide, and both divisional and core IS&S staff had agreed to performance metrics for each service. Quarterly performance and commitment reviews were scheduled so that IS&S could review how the process was working and what specific changes in services and service levels were needed.

Staffing an SLA-based organization

Three sets of key players in the SLA effort were the service owners, the corporate and divisional CIOs based in the business units and the members of the SLA Portfolio Management team. These were the individuals charged with making the SLA concept work.

Service Owners were responsible for meeting the services outlined in the SLAs, managing the costs and revenues associated with providing their services and for improving their relationship with their customers. They were expected to meet with customers to learn their needs, explain services and benchmark against external providers to determine whether to source internally or externally. As an example, Larry Proctor, Service Owner for Network Connectivity, would lead a 35-person team responsible for the firm's wide area network (WAN) and its connection to on-site local area networks (LAN). The team's responsibilities included the following: collect business unit requirements for their WAN connections; engineer the network; negotiate with and monitor vendors who provided network services (e.g., Cisco, Cabletron, AT&T); establish architecture standards for LANs; and oversee and support the network. Proctor's team had established network availability as its primary metric and planned to collect availability statistics from each of the firm's 430 routers and report them on a daily, weekly and monthly basis via a WEB site. This team would be the primary customer of Steve Groce's help desk support team. Groce's team would provide first level support and escalate appropriate problems to Proctor's team as necessary.

The service owners were becoming, in effect, general managers of a small business. Most were enthusiastic about this role:

> This is as it should be. I'll have to market my services to my customers. If they don't see value in what I offer, they won't buy it. (Danny Offil, Service Owner, UNIX Enterprise Computing Servers)

> I absolutely must make budget. It is my responsibility and important to the assessment of my performance. And I am motivated to squeeze the most out of my resources because I want to be able to fund some R&D. No R&D is funded in the SLA agreement. (Steve Dean, Service Owner, Enterprise-Level Mainframe Applications)

The business CIOs were responsible for understanding the business units' strategies and priorities, translating the strategies into IT requirements and communicating the businesses' requirements to the service owners. They worked very closely with the core IS&S service owners

to ensure that capacity planning and systems management included unique business requirements. Business CIOs also negotiated the services that a business would purchase and the service performance metrics that were acceptable. For large divisions it also involved purchasing fewer centralized services and taking more responsibility for their computing, but one business unit IT manager anticipated that the biggest impact of SLAs would be reduced IT costs:

> The main difference SLAs make is that they place an upper limit on how much we will spend on IT. If core IT can't deliver the services for less, we'll buy them from someone else. We don't care if we buy our services internally or externally, but we want to stop spending so much on IT. (Larry Dix, Systems Manager, Semiconductor Group)

Another business unit manager argued that the impact of SLAs was in how they would change conversations with IS&S:

> Now they will face us across the table and say "This is what I'm charging you for a six kajillion bit communication line," and we can say, "If I only had a one kajillion bit communication line what level of service would I get and what would be the cost differential?" They aren't yet able to answer those questions, but they need to do so. (Paul Danesi, Vice President, Controller, Materials and Control Group)

Dan Murphree, Director of Business Alignment, identified the need for an SLA Portfolio Management team. The SLA Portfolio Management team was responsible for overseeing the creation of processes and tactics necessary to implement the SLA strategy, manage the IT comparative assessment activities and conduct the quarterly commitment reviews.

This team created SLA processes and templates used by the service owners, including a Web based repository housing all SLAs and metrics. This made access to the SLAs easy for the customers. Examples of processes include: incremental IT services, service termination, metrics reporting and shared funding. These processes enabled consistency in work product for the customer and allowed the service owners to focus on delivering their services.
The quarterly commitment review meetings between the divisional CIOs and the core IS&S leaders provided an opportunity to discuss business priorities, strategies and IT needs as well as to discuss how well core IS&S was meeting SLA commitments and service metrics.

> SLAs are not a quick fix to close IT's credibility gap with the business units. I do believe, however, they are an important first step in achieving improved customer satisfaction, customer intimacy and moving toward a customer driven approach in delivering IT services. (Bonnie Lawson Wagner, Manager, SLA Portfolio Management)

Anticipated impacts from the transition to SLAs
With the SLA implementation and other IT reductions within the business units, the 1997 budget for TI came in 17% below the 1996 level and 9% below the 1995 level. The reduced costs would

be realized from headcount reductions and from identifying cost savings in delivering individual services. Due to the early retirement option offered to long-term employees, a partnering arrangement with Andersen Consulting for SAP implementation, and a number of voluntary resignations, total IS&S headcount in December 1996 was around 1700, down from approximately 2200 at the start of the year.

To meet tight budgets, some service owners had immediately focused on the costs of their operations and identified opportunities to cut costs. In the networking area, for example, Larry Proctor, service owner for network connectivity, had been able to shave $8 million from 1996 expenditures of $51 million by redefining and simplifying the network architecture, and negotiating new subnetwork contracts with telecommunications providers.

During the first year, IS&S management, as well as service owners, hoped to better identify the services and alternative service levels that would benefit their internal customers. They expected to better understand cost drivers of each service as service owners studied the expenses that accrued to their areas and observed variability in usage. Service owners recognized the importance of managing IT costs but they were wary of the negative impacts of a budget-driven SLA process:

> I'm afraid that I might not really be given the opportunity to run my service as a business due to artificial spending limits. If I have a good service to offer and someone wants to buy it, they should be able to make that decision. The spending cap means they can only make that decision if they spend less on other IT. (Steve Dean, Service Owner, Enterprise-Level Mainframe Applications)

IS&S management anticipated that the first year of the SLA process would be very much a learning experience. Business unit management might want to eliminate services that they had originally requested and IS&S would need to determine whether they could reduce their costs accordingly. In other cases, business units might want to add optional services that they had not originally requested. IS&S management felt that some services would be difficult to restore once dropped.

> We very specifically did not put penalty clauses in there. We did not want this to be seen as a contract. In fact, we call them agreements on purpose. These are guidelines as to how we want to operate with each other and not legal documents. (Dan Murphree)

Top IS&S management felt that the process of designing the SLAs had greatly increased mutual understanding between IS&S and business unit CIOs. They observed that the nature of the conversation in the weekly meetings of the IS&S leadership team had started to focus on identifying shared infrastructure needs. For example, several divisions were negotiating for joint development of new capabilities for connecting with customers or contractors and two divisions were interested in sharing IS&S costs for developing electronic storefronts. These discussions were helping to define future IS&S services. As TI entered the initial year of SLAs, IS&S management hoped these conversations would continue:

> I'm confident. I'm very confident, but it's going to be painful for a while. And it's not going to be one year; it's going to take two or three years. My hope is that the conversations don't stop when we get in a good profit situation again. If they stop then, we haven't been successful. This kind of conversation should take place all the time. (Deneese Gipson, IT Controller)

Postscript

By early 1997, TI had announced a number of additional divestitures including its software and defense businesses. With these divestitures, the semiconductor business represented 80% of TI's revenue, and digital signal processing solutions had become its primary focus. With one business representing the majority of the company, management felt it no longer made sense to have separate central shared services and dedicated business IT organizations. In May 1997, the Corporate IS&S and Semiconductor IT organizations were combined into a single IT Services organization, headed by Pallab Chatterjee, who had formerly held positions as head of research for the semiconductor business and president of the notebook, printer and calculator businesses. This new organization reported into the semiconductor business with responsibility for both the IT needs of that business and the shared services used by the other TI businesses.

Chatterjee noted that he was committed to continuing the efforts to increase the impact of the IT organization on the business bottom line:

> Service Level Agreements used internally is a proactive way of making business alignment happen. (Pallab Chatterjee, Senior Vice President, CIO, Semiconductor Group)

In addition to the continuation of the SLA concept, several evolutionary steps were initiated:

- Relationship managers were assigned to represent each of the business segments. These managers were given responsibility for aligning business needs and IT capabilities to deliver business success.
- IT management was working to clarify the roles of customer vs. user of IT services. The customer was the business leader who made the decision to buy or use the service; the user was the end recipient of the system or service.

- Chargeback rate structures would be modified to further bundle services and bill them at the level driving additional costs. TI was focusing on identifying two particular cost drivers: those driven by the addition of a site, and those driven by the addition of people.

- In the future, chargeback rates would be set for basic levels of service with premium services available for an additional charge. This would replicate the approach used by the telephone and cable industries for their utility services.

TI had committed to a multi-year transition following the business' positive reaction to the SLA transition. IT management was looking for opportunities to streamline the process and further engage with the businesses.

September 1997

Exhibit 1
Texas Instruments Incorporated
Summary of Selected Financial Data, 1995 Annual Report

Years Ended December 31	1995	1994	1993
Millions of Dollars			
Net revenues	$ 13,128	$ 10,315	$ 8,523
Operating costs and expenses	11,534	9,232	7,795
Profit (loss) from operations	1,594	1,083	728
Other income (expense)net	73	4	15
Interest on loans	48	45	47
Income (loss) before provision for income taxes and cumulative effect of accounting changes	1,619	1,042	696
Provision for income taxes	531	351	220
Income (loss) before cumulative effect of accounting changes	1,088	691	476
Cumulative effect of accounting changes	—	—	(4)
Net income (loss)	$ 1,088	$ 691	$ 472
Earnings (loss) per common and common equivalent share:			
Income (loss) before cumulative effect of accounting changes	$ 5.63	$ 3.63	$ 2.54
Cumulative effect of accounting changes	—	—	(0.03)
Net income (loss)	$ 5.63	$ 3.63	$ 2.51
Dividends declared per common share	$ .64	$ .47	$ .36
Average common and common equivalent shares outstanding during year, in thousands	193,631	190,855	187,211

As of December 31	1995	1994	1993
Millions of Dollars			
Working capital	$ 2,330	$ 1,818	$ 1,313
Property, plant and equipment (net)	3,187	2,568	2,203
Total assets	9,215	6,989	5,993
Long-term debt	804	808	694
Stockholders' equity	4,095	3,039	2,315
Employees	59,574	56,333	59,048
Stockholders of record	30,034	28,740	29,129

Exhibit 2
1992 IS&S Organization Chart

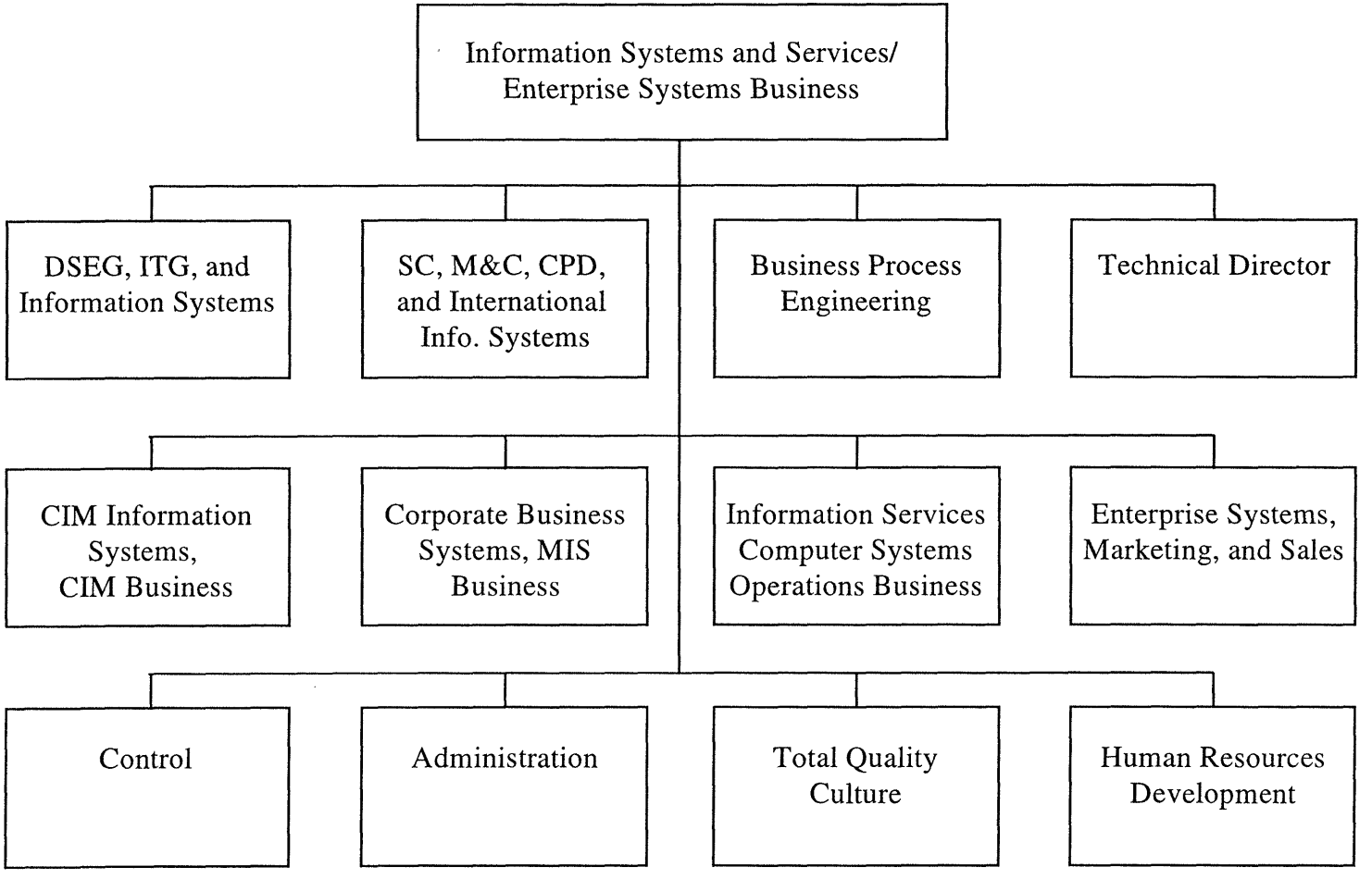

Exhibit 3
Information Systems and Services Organization

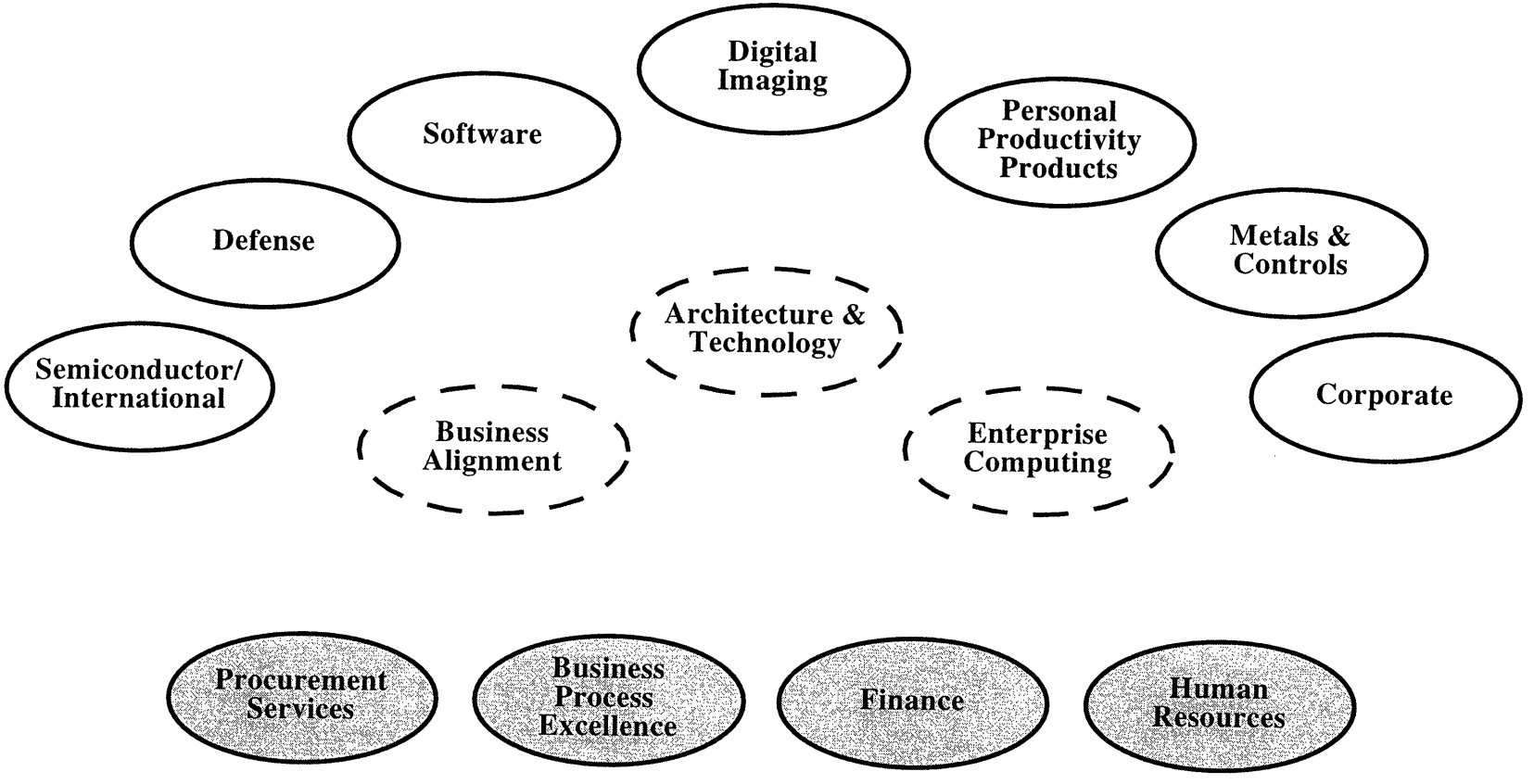

Exhibit 4
Examples of IS&S Line Item Charges to Business Units (Pre-1995)

EFT Transaction	0.010/each
Fourlough Master Rec	0.750/record
Pay u-p/check	0.24/each
Apple Program Consulting	55.00/hour
Data storage	0.04/1000 datapoints
Attitude survey	100.00/site/survey
EEO system	0.03/employee + 100.00/feed
HRDB focus file creation	0.03/employee record/month
HRDB payroll report	0.20/transaction
HRDB batch update	100.00/update
Tax reporting — 1st close	0.012/each
Tax reporting — 2nd close	0.005/each

Exhibit 5
Service Level Agreement Implementation Time Line

- Decide to move to SLAs
- Identify existing IS&S Services
- Reach consensus on enterprise/optional/business categorizations
- Business CIOs select optional services
- Define new services and allocate 1997 budget
- Negotiate services and costs/determine metrics
- Reorganize around services/appoint service owners
- Complete implementation of service-based business model
- Complete first commitment reviews
- Do competitive assessments and benchmarking
- Provide businesses skill training for service owners
- Assess and modify service agreements
- Negotiate 1998 agreements

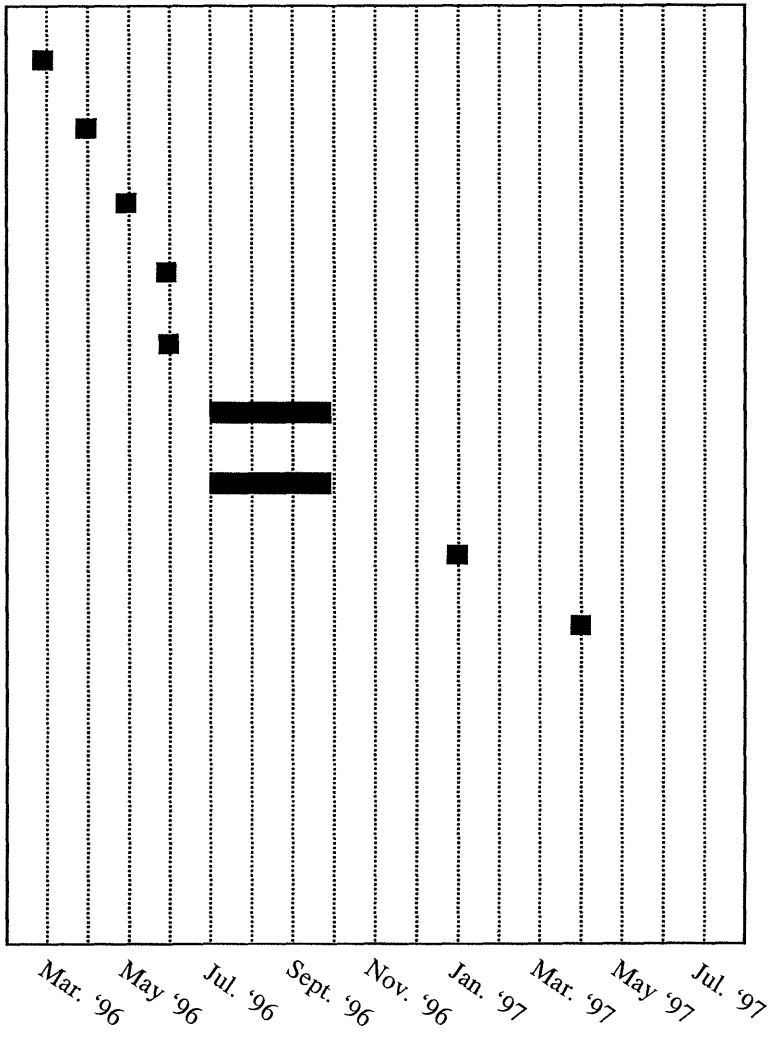

Exhibit 6
Enterprise IT and Business Plan for Optional IT

Information Technology (IT) Services			
1 Enterprise-Level Services		**2.5 Voice Services, cont.**	
1.1 Architecture and Technology		2.5.4 Delpoy other voice services	O
1.1.1 Define common bus. and info. architecture	E	2.5.5 Support other voice services	O
1.1.2 Define applications architecture	E	**2.6 Voice Mail (prod & svc)**	
1.1.3 Define technical architecture	E	2.6.1 Architect/oversee voice mail	E
1.1.4 Define and deploy IT standards	E	2.6.2 Engineer voice mail	O
1.2 IT Strategy Management		2.6.3 Deploy voice mail	O
1.2.1 Comprehend business plans	E	2.6.4 Support voice mail	O
1.2.2 Define IT strategy	E	**2.7 Video Conferencing (prod & svc)**	
1.2.3 Develop IT plans	E	2.7.1 Architect/Oversee video conferencing	E
1.2.4 Allocate resources	E	2.7.2 Engineer video conferencing	O
1.3 IT Process Mgmt (SEI, solution provisioning)		2.7.3 Deploy video conferencing	O
1.3.1 Define IT Processes	E	2.7.4 Support video conferencing	O
1.3.2 Deploy IT processes	O	**3 Connectivity Solutions—TI to Outside**	
1.4 Total Quality Management		3.1 Architect/Engineer/Oversee connectivity sol	E
1.4.1 Customer interview program	O	3.2 Deploy enterprise connectivity solutions	O
1.4.2 Customer survey program	O	3.3 Support enterprise connectivity solutions	E
1.4.3 Quality Award for Excellence (QAE)	O	3.4 Deploy business connectivity solutions	O
1.4.4 TI-BEST	O	3.5 Support business connectivity solutions	O
1.5 Infrastructure Services (prod. and serv.)		**4 Distributed Computing Services**	
1.5.1 Provide naming services	E	**4.1 Enterprise Computing Servers (UNIX & NT)**	
1.5.2 Provide IT security	E	4.1.1 Arc/Eng/Dep/Ovr enterprise comput. servers	E
1.5.3 Provide interoperability services	E	4.1.2 Support enterprise computing servers	O
1.5.4 Provide disaster recovery planning	E	**4.2 Business Computing Servers (UNIX & NT)**	
1.5.5 Provide help line service (level 1 domestic)	E	4.2.1 Architect/Oversee bus. computing servers	E
2 Communications Services		4.2.2 Engineer bus. computing servers	O
2.1 Wide-Area Network (WAN) prod & svc		4.2.3 Deploy bus. computing servers	O
2.1.1 Provide Wide-Area Network (WAN) svc	E	4.2.4 Support bus. computing servers	O
2.1.2 Equipment ownership	O	**4.3 Workgroup Solutions Services (Notes, etc.)**	
2.2 Local-Area Networks (LAN) prod & svc		4.3.1 Architect/Oversee workgroup solutions	E
2.2.1 Architect/Engineer/Oversee LAN	E	4.3.2 Engineer workgroup solutions	O
2.2.2 Deploy LAN	O	4.3.3 Deploy workgroup solutions	O
2.2.3 Support LAN	O	4.3.4 Support workgroup solutions	O
2.2.4 Equipment Ownership	O	4.3.5 Equipment ownership	O
2.3 LAN Management Services (service only)		**4.4 Product Expert Services (level 2, svc only)**	
2.3.1 Engineer LAN management services	E	4.4.1 Provide enterprise product expert services	E
2.3.2 Offer LAN management services	O	4.4.2 Engineer shared product expert services	O
2.4 Dial-Up Connectivity (prod & svc)		4.4.3 Offer shared product expert services	O
2.4.1 Architect/Engineer/Oversee dial-up access	E	4.4.4 Engineer bus.-unique product expert services	B
2.4.2 Deploy dial-up access	O	4.4.5 Offer bus.-unique product expert services	B
2.4.3 Support dial-up access	O	**4.5 Desk-Side Services (service only)**	
2.5 Voice Services (prod & svc)		4.5.1 Engineer desk-side services	B
2.5.1 Architect/Oversee voice services	E	4.5.2 Offer desk-side services	B
2.5.2 Engineer/Deploy/Sup N. TX voice services	E	**4.6 Production Services (svc only)**	
2.5.3 Engineer other voice services	O	4.6.1 Engineer production services	O
		4.6.2 Offer production services	O

Information Technology (IT) Services			
5 Mainframe Services (MVS)		**6.3 Business Unique Applications (prod & svc)**	
5.1 Mainframe Computing Services - LE		**6.3.1 Business-Unique Distributed Applications**	
5.1.1 Provide mainframe computing services	E	6.3.1.1 Architect application	B
5.2 Mainframe Computing Svc UM/MIHO/JF		6.3.1.2 Engineer application	B
5.2.1 Equipment Ownership	B	6.3.1.3 Deploy application	B
5.3 Mainframe Management Services		6.3.1.4 Oversee application	B
5.3.1 Arc/Eng/Dep/Oversee MF mgmt svcs	E	6.3.1.5 Sustain application	B
5.3.2 Support MF management services	O	6.3.1.6 Enhance application	B
6 Applications		**6.3.2 Business-Unique Mainframe Applications**	
6.1 Enterprise-Level Applications (prod & svc)		6.3.2.1 Architect application	B
6.1.1 Provide distributed enterprise-level apps.	E	6.3.2.2 Engineer application	B
6.1.2 Provide mainframe enterprise-level apps.	E	6.3.2.3 Deploy application	B
6.2 Shared Applications (prod & svc)		6.3.2.4 Oversee application	B
6.2.1 Shared Distributed Applications		6.3.2.5 Sustain application	B
6.2.1.1 Architect applications	O	6.3.2.6 Enhance application	B
6.2.1.2 Engineer application	O	**6.4 Application Services (prod & svc)**	
6.2.1.3 Deploy application	O	6.4.1 Offer application dev/deploy/mgmt tools	O
6.2.1.4 Oversee application	O	6.4.2 Offer consulting support/customization	O
6.2.1.5 Sustain application	O	**6.5 New Solutions Assembly (prod & svc)**	
6.2.1.6 Enhance application	O	6.5.1 Enterprise-level applications	O
6.2.2 Shared Mainframe Applications		6.5.2 Shared applications	O
6.2.2.1 Architect application	O	6.5.3 Business-unique applications	B
6.2.2.2 Engineer application	O	**7 Extended Services (svc only)**	
6.2.2.3 Deploy application	O	**7.1 Network Consulting Services**	
6.2.2.4 Oversee application	O	7.1.1 Engineer network (not linked to WAN)	O
6.2.2.5 Sustain application	O	7.1.2 Deploy netework (not linked to WAN)	O
6.2.2.6 Enhance application	O	7.1.3 Support network (not linked to WAN)	O
		7.2 Business Support Services	
		7.2.1 Offer extended account management	O
		7.2.2 Offer IT consulting services (emerging tech.)	O

LEGEND		
E	Enterprise IT	Provided by IS&S to all bus. units
O	Optional Services	Agreed to in SLA process
B	Business Unit Provided	Former IS&S Services to be assumed by the bus. units

Exhibit 7
IS&S 1997 SLA/PDA Services

1 Enterprise-Level Services
1.1 Dev - Architecture & Technology
1.2 IT Strategy Management
1.3 IT Process Management
1.4 Total Quality Management
1.5 Infrastructure Services Consulting
1.6 Development—strategic reserve
1.6 Admin/HR/Finance/Matl Svces
1.6 Corporate people allocations

2 Communications Services
2.1 Core Network - Infrastructure Eng & Ops
2.1 Core Network - MSA Cost to Non-MSA Sites
2.1 Core Network - MSA Cost to MSA Sites
2.2 Site Network Dedicated Sites
2.3 Site Network Shared Sites (IS&S as host)
2.3 Central IS&S LAN only
2.4 Dial-Up connectivity (prod & svce)
2.5 Voice Services (prod & svce)
2.6 Video Conferencing (prod & svce)

3 Connectivity Solutions - TI to o/s (prod & svce)
3.1 E-mail (prod & svce)
3.2 EDI (prod & svce)
3.3 InterCorporate Gateways (prod & svce)
3.4 Internet (prod & svce)
3.5 Lotus Notes Spt (prod & svce)

4 Distributed Computing Services
4.1 Enterprise Computing servers (UNIX), (central owned products & services)
4.1 Enterprise Computing servers (NT), (central owned products & services)
4.2 Business Computing servers (UNIX), (business owned products & services)
4.3 Workgroup solutions services (prod & svce), (business computing NT)
4.4 Product Expert services, level 2, svce only
4.5 Desk-side services (svce only)
4.6 Production services (svce only)

5 Mainframe services
5.1 Mainframe Computing services - commercial
5.2 Mainframe Computing services - manufacturing
5.1/2 Mainframe DASD LE
5.1/2 Mainframe TMM DASD LE
5.1/2 Mainframe Print LE
5.1/2 Mainframe Fiche LE
5.3 Mainframe Management services (svce only)

6 Applications
6.1.2 Enterprise level mainframe applications (prod & svce)
6.1.1 Enterprise level distributed applications (prod & svce)
6.1.3 Enterprise level backup & restore (prod & svce)
6.1.4 Enterprise level electronic doc mgmt (prod & svce)
6.2 Shared applications (S.A.P. amortization)
6.3 Business unique applications (prod & svce)
6.4 Applications services (prod & svce)
6.5 New solutions assembly (prod & svce)

7 Extended services (svce only)
7.1 Network Consulting services
7.2.1 Business Support services - Center of Excellence
7.2.2 Business Support services - Infrastructure Provisioning

8 Non IT related services (usage based)
Training
Computer Acquisitions Group
Business & Strategic Services
Information Center - CBS
Information Resource Services - NB

Exhibit 8
Simulation of XX Group 1997 IS&S Charges

XX Group Business Unit Summary	Enterprise	Committed*	Optional	Total
1. Enterprise-Level Services	5.814	0.000	0.163	5.977
2. Communications Services	4.816	9.327	0.000	14.143
3. Connectivity Solutions	1.345	0.000	0.357	1.702
4. Distributed Computing Services	1.720	0.000	0.000	1.720
5. Mainframe Services	11.316	0.000	0.020	11.336
6. Applications	2.104	0.000	0.387	2.491
7. Extended Service (service only)	0.000	0.000	0.495	0.495
Total Business Cost	27.115	9.327	1.422	38.864
Non IT Related Services	0.000	0.047	1.753	1.825
Total Business Cost Recovery	27.115	9.374	3.175	40.689

*Committed amounts are targeted to become optional, but are the result of existing TI assets.

Exhibit 9
Examples of SLA Descriptions, Metrics and Charges

Service	Description	Metrics	How Charged
Help Desk	First-level trouble-shooting, maintenance of problem resolution system	Pass/fail goal = 3.37 sigma (97%)	Allocation based on % of IS&S services used in prior year
Core network	Architect, engineer, deploy oversee and support enterprise WAN; set standards for LANs; provide some LAN support	Availability measured by router for both LAN & WAN; Goal = 4.3 sigma	Allocation based on exempt headcount (sometimes specific to sites involved)
Dial-up services	Provide dial-in access to TI's network through alternative hw/sw configurations	Server & hub availability; goal is 3.1 sigma (95%)	Allocation based on exempt headcount (purchased services are direct billed)
Voice services	Architect, oversee & support telephone & operator switches	Grade of service; goal is 1 busy signal in 100 attempts	Fixed rate per telephone line charged to cost center