Chapter 3

Telephone Call Accounting

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INTRODUCTION

The personal use of government telephones, and the controversy about what to do about it, was in the news throughout 1985 and 1986. News stories carried headlines like: "U.S. Agencies Use High Tech To Curb Workers' Phone Use: Savings Estimated at $300,000 a Year,"[1] "U.S. Phones Raise Issue of Privacy: New Equipment Would Provide Detailed Records of Calls."[2] "U.S. To Use Program To Audit Federal Employees' Calls,"[3] "Planned Phone Audit Brings Blast From Several Groups, "[4] "Toll Calls Abused by U.S. Employees, "[5] and "Listen Up Government Workers: You May Be Allowed One Call."[6]

Personal phone use in government was examined in an audit conducted by the General Services Administration (GSA) under the President Council on Integrity and Efficiency (PCIE). That audit reported in the spring of 1987 that an average of about 33 percent of off-network calls sampled on the Federal Telecommunications System (FTS) were "unofficial, " i.e., made for personal reasons.[7]

Of course personal use of employers' telephones is not a phenomenon limited to government. Telephone use has been called a "phantom job benefit" because many employees, in both public and private sectors, believe they have a right to make some calls from the telephone on their desk. Reliable data are not available for the private sector, but telecommunications experts have given estimates of personal use in the private sector that range from 10 or 15 percent[8] to as high as 30 or even 50 percent.[9]

Employees' personal use of telephones has been going on for years-a common practice that many firms and agencies have ignored as being of little importance. However, in the past few years new technological tools to measure and control telephone costs have come on the market and are being enthusiasticall,pro-moted by a growing segment of the telecommunication industry. Deregulation of the telephone industry has forced many firms to pay greater attention to the costs and management of their telephone systems. Although long-distance rates have declined steadily for the past decade, telephone costs remain a major business expense. Many firms have adopted new technologies, such as telephone call-accounting software, in an effort to further control these costs.

Controversy arises because use of call-accounting software may impinge on the privacy of people using the telephone system. Although its best and most common use is as a statistical tool to analyze patterns of telephone use for a firm or office, call-accounting records can also provide detailed information about each individual call, whether official or personal. The software automatically can record the information law enforcement officials sometimes gather using 'pen registers '—the exact time, date, originating extension, and destination number of every call-local or long

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[1] Interview with Edward Horrell, Mitchell & Horrell L Inc. ! June 24, 1986.

[2] New *York Times,* **Mar.** 17, 1985.

[3] *Computerworld, Mar. 25, 1985.*

[4] *Federal Times, Mar.* 25, 1985.

[5] *Washington Post,* June 21, 1986.

[6] *Washington Post,* Sept. 11, 1986.

[7] President's Council on Integrity and Efficiency, "Consolidated Report on Federal Telecommunications System (FTS) Utilibation, " prepared by the General Services Administration, Office of the Inspector General, Mar. 16, 1987.

[8] Interview with Edward Horrell, Mitchell & Horrell, Inc., June 24, 1986.

[9] Judith Havemann, "Toll Calls Abused by U.S. Employees, " *Washington Post,* June 21, 1986.

distance. Such information, properly examined, can sometimes provide considerable information about the caller.[10]

This chapter reviews the growing trend in use of call-accounting software by employers in and out of government. It also attempts to place call accounting in the context of other telecommunication management tools. Call accounting is only one of a number of technologies gaining use in firms and government agencies to control telephone costs. This chapter also discusses other techniques that can be used instead of or in addition to call accounting.

Managing Telephone Costs

Controlling personal calling is not the only way to reduce the telephone bill. Industry experts estimate that 35 to 40 percent or more of all long-distance calls are "waste calls. " These are sometimes characterized as a combination of four factors:

- poor system design,
- . fraud (unauthorized use by outsiders),
- abuse (personal use by authorized users), and
- ● misuse (overuse or the use of a high-cost service when a low-cost alternative is available). [1]

The proportional importance of each category varies from one organization to another, but abuse and misuse are often the largest, according to some experts. Several technological approaches for combatting them are discussed in this chapter.

Poor system design means that telephone equipment and service are not suitable to the particular calling patterns of the firm. In the past 10 years, a bewildering variety of alternatives has developed for business telephone

subscribers. Good telecommunications management begins with understanding the needs of the firm and making basic decisions about the size of the system needed, what long-distance carriers to use, whether to lease private lines or to own private switches, and so on. Because of the wide variety of services offered and the different rate structures of the long-distance telephone companies (carriers), wrong design decisions can be costly. Telephone call accounting, as discussed later in this chapter, can be useful in giving a clear picture of telephone use on which to base management decisions.

Telephone fraud perpetrated by outsiders can be costly to an individual firm, but most of its costs fall on the telephone industry and users as a whole. Fraudulent activities range from individual hackers using private systems for their own calls to multilevel marketing schemes that sell illegally obtained authorization codes to consumers. If the legitimate user (individual or corporate) notices charges for these calls on the phone bill and denies making them, the cost is usually absorbed by the long-distance carrier. The cost of telephone fraud was estimated at $500 million in 1985. [12] The telephone industry is attempting to combat fraud by improving system software's ability to detect and investigate illegal users. As will be discussed later in this chapter, telephone call accounting can help firms reduce costs due to fraud by giving them an accurate listing of telephone calls independent of their telephone bill.

There are two basic approaches to reducing unwanted calls. The first is to keep careful track of all calls so that problems of misuse or personal use can be tracked and people who make the calls can be identified. This is called a passive approach to telephone management, and the principal tool is telephone call accounting. The second approach is to design the telephone system so that unwanted calls are difficult or impossible to make, and so that calls that are made are of reasonable length. This

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[10]For a discussion of the use of pen registers in law enforcement, see U.S. Congress, Office of Technology Assessment, *Federal Government Information Technology: Electronic Surveillance and Civil Liberties, OTA-C IT-293* (Washington, DC: U.S. Government Printing Office, October 1985).

"Interview with Edward Horrell, Mitchell & Horrell, Inc., June 24, 1986.

[12]Walter G. Frier, "Combating Long Distance Service Abuse, " *Telephony,* Aug. 11, 1986, pp. 69-70.

active approach to telephone system management is aided by such technological tools as least-cost routing, call blocking, and timed signals.

As the Federal Government begins the process of revamping its telephone system, it will undoubtedly make use of several of these techniques. The one that has aroused the most controversy is call accounting, because of questions about the privacy of individuals who make the calls. With the advent of improved records on all long-distance calls, the government finds itself faced with the need to review and revise some outdated policies related to the use of its telephone system. Before discussing these policies in detail, however, it would be good to look at how active and passive telephone management tools work and how they are used in government and private industry.

TELEPHONE CALL ACCOUNTING

In the past 3 years, telephone call accounting has become one of the fastest growing segments of the telecommunications market, but call accounting is nothing new. Every consumer engages in telephone call accounting at home by reviewing the monthly telephone bill to make sure that all the long-distance calls listed were actually made by someone in the household.

Telephone bills for businesses, while they are sometimes more complex than residential bills, provide essentially the same information: the date, time, duration, destination, and cost for calls. Usually all this information is provided to business customers as a matter of course for direct-dial or operator-assisted long-distance calls. However, long-distance calls made on Wide-Area Telecommunications Service (WATS) lines (which are billed on an average-cost-per-call basis) and local calls usually are not reported in detail to business customers, unless specially requested and paid for.

Businesses and government agencies are becoming more aware of the value of an accurate record of calls in managing and reducing their telephone costs. Even if call detail is provided by the carrier (long-distance telephone company), the firm may want an independent record of telephone calls in order to verify the carriers' bills or allocate telephone costs to different departments within the organization. Businesses can get such accurate, up-to-date call accounts either from a "service bureau, or through a call-accounting system on their own premises.

It is estimated that about 19,600 stand-alone call-accounting systems were sold in 1985, amounting to revenues of about $206 million for their manufacturers. This market is growing at about 50 percent per year and there are currently about 130 firms that either manufacture a call-accounting device, write call-accounting software, or provide call-accounting services.[13] In addition, many private branch exchanges (PBXs, the computerized switching systems that route telephone calls in many offices, have built in call accounting capability.

How Call Accounting Works

Raw data about calls-the time, duration, called number, originating extension, and estimated cost—can all be collected by a device called a station message detail recorder (SMDR) that can be attached to the telephone system. SMDRs can produce an enormous volume of information that is of little use until it is processed and analyzed.

Probably the oldest type of call accounting is offered by computer service bureaus, which came into existence around 1970. The service bureau uses mainframe computers to process the magnetic tapes produced by SMDRs and provides the customer with monthly or quarterly reports. The cost for such a service varies widely. Depending on the number of lines, the fee can range from $1 to $4 per telephone. "

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[13]Daniel I. Strusser, "Good News in the Call Accounting Market, " *Teleconnect,* March 1986, p. 62.
"Daniel I. Strusser, "The Six Kinds of Call Accounting, " *Teleconnect,* March 1986, pp. 66-71.

Figure 9.—Sample Call Detail Report

Date: 03/07/84
Time: 11:56:20   Page: 1

Report Period: 2/24 - 2/29

Name: Dan Jones   Division: Telecommunications
Ext: 1551   Department: Engineering

Date	Time	Duration	Charge	Number called	Facil	(1) City	ST	(2) Acct. Code
2/24	08:01	00:12:15	0.06	*616-429-2998*	Local	St. Joseph	MI	
2/24	11:35	00:25:00	5.86	*703-620-0880*	WATS	Roanoke	VA	
2/25	08:46	00:00:30	0.06	616-429-4151	Local	St Joseph	MI	
2/25	08:52	01:12:30	25.90	212-829-4272	DDD	New York	NY	
2/25	10:57	00:07:30	0.10		Incmg			
2/25	12:57	00:10:56	4.10	714-525-5252	MCI	Anaheim	CA	
2/25	14:00	00:16:01	6.27	312-577-7901	FX	Chicago	IL	
2/25	14:07	00:01:30	0.10		Incmg			
2127	09:43	01:05:03	35.12	714-525-5252	DDD	Anaheim	CA	
2/27	12:55	00:01:00	.42	703-620-0880	WATS	Roanoke	VA	
2/27	13:14	00:10:00	0.06	616-429-6241	Local	St Joseph	MI	

	Totals:	03:42:15	>7.15					
	Fixed:		5.00	Calls: 11	Cost/M in:	*.33*		
			82.15					

There are about 30 firms in the United States that provide this service. Service bureaus have generally been used only by large firms with high volumes of calls and multiple sites.[15]

Advances in computer technology are now making call accounting more economical for smaller firms. Call-accounting software is now available for direct use by the customer, and it can be run on personal computers, minicomputers, and mainframes. About half of the service bureaus, along with dozens of other companies, lease or sell call-accounting software for customers to use. In addition, some PBXs come with built-in capability to record raw call data with a SMDR and to process call-accounting reports. Prices for call-accounting software vary widely, from as low as $800 up to $40,000, depending on the size of the telephone system and on the special features that might be desired.[16] Many software packages produce not only a detailed listing of all calls, but also allow the development of a number of standard and customized reports.

Call Accounting and Telephone System Management

The report-generating capability of the system is important. While the call-accounting de vice keeps track of all calls in the order they are made, a simple printout of all call records may be of little use, especially in a large firm with thousands of telephones and dozens of locations.

Figure 9 is a sample printout from a call-accounting system. This particular system is designed for small companies–with perhaps 100 to 500 telephones–and runs on a personal computer. Raw call data is transferred to the personal computer from the SMDR through a RS232 connection (like the modular phone jack on most telephones). Once the call records are loaded on the computer, the call-accounting software can produce a number of standard and customized reports. Figure 9 shows all the calls of a particular extension (1551), including the date, time, duration, cost, number called, and city and State of destination number. This information is similar to that found on a telephone bill, except that there is somewhat greater detail. To some extent the level of detail to be used in reports can be chosen by the

[15]MCI Education Center, *Gaining the Competitive Edge: Network Design,* p. L-6.

I"Daniel I. Strusser, "The Six Kinds of Call Accounting, " *Teleconnect,* March 1986, pp. 66-71.

Figure 10.— Sample Summary of Calls

Date: 03/07/84
Time: 11:43:37   Page: 1

Report Period: 2/24 - 2/29

Ext.	Name	Total cost	Fixed cost	Local cost	L.D. cost	OutDur HR:MN	Incom cost	InDur HR:MN
101	Jackson, John	16,54	0.35	0.00	16.19	0:25	0.00	0:00
102	Cheever, Chuck	4,48	0,27	0.00	0.75	0:05	0.40	10:32
103	Berg, Wendy	9,36	0.42	5.61	3.33	0:11	0.00	0:00
104	West, Ellen	4,00	4,00	0.00	0.00	0:00	0.00	0:00
111	Cassidy, Mike	16,88	0,56	0.00	13.62	0:18	2.70	5:12
125	Ryan, Pete	3.25	3.25	0.00	0.00	0:00	0.00	0:00
150	Potts, Karl	1,20	1,20	0.00	0.00	0:00	0.00	0:00
155	Jones, Dan	83.05	5,00	0.18	77.67	3:33	0.20	0:09
	Totals:	138,76	15,05	5.79	111.56	4:32	3:30	15.53

system manager. For example, this particular firm has chosen to list and assign a cost to local calls as well as long-distance ones, and to include a listing and charge for incoming (Incmg) calls.

Figure 10 shows a summary report by extension, summarizing the costs and activities of all telephones in a particular department. Similar detailed and summary reports could be generated by extension, by caller, or by account code, for each department or division in the firm.

More sophisticated cost-accounting reports are also useful for equitably allocating telecommunication costs. Based on reports generated by the call-accounting system, costs can be allocated to the proper department, project, or customer account. Law offices, for example, which must keep accurate records of each attorney's expenditure of time and resources for each client, can generate accurate reports of telephone calls related to each case. This might be done either by having staff members dial a cost code before dialing each number, or by having the call-accounting system store telephone numbers known to be frequently used for each client. Call accounting software for hotels and hospitals produces phone changes for inclusion in client bills.

Another advantage of modern call-accounting software is the ability to process mountains of raw call data into useful information about calling patterns and system utilization. For example, a summary of all calls by trunk (or type of service) would enable a telecommunications manager to compare the number of calls and relative expenditures for direct dial and WATS lines to determine if the firm has the right facilities to meet current needs. Or the system could produce a report of the 50 most frequently called numbers, in order of frequency. The telecommunications manager might use this information to determine whether a private line connection would be a more economical way to carry calls between the main office and a frequently called branch office. A report on trunk utilization, by day and hour, can also be useful in analyzing the level of use of the telephone, and might also be useful evidence in case of disputes with carriers about the amount of the telephone bill.

Call Accounting and Employees' Personal Use of Telephones

At some firms and government agencies, analysis of the most frequently called numbers turned up a large number of calls to off-track betting, "Dial-a-Porn," the weather report, and many long-distance calls to locations that did not do business with the organization.

Employees' personal use of employers' telephones has become a concern in the past few years and reference to the money being spent on personal calls is a major sales tool for ven-

dors of call-accounting equipment. Telecommunications trade magazines (and advertisements of cost-accounting system vendors) are full of anecdotes about abuses uncovered when firms first start keeping track of their telephone calls. Stories include, for example, the secretary who placed a one-hour long-distance call during lunch every day in order to listen to a soap opera on her mother's television. Or the man who ran his personal business from the office telephone–a business that required hundreds of long-distance calls weekly. Or the woman who used the call-forwarding feature of her office telephone to receive many hours of long-distance calls at home in the evening.

On the other hand, many other people are using employers' telephones in much less expensive, but still pervasive ways. Employees are human beings with concerns beyond the workplace, and they sometimes have personal business that must be somehow completed during work hours. People with toothaches have to call the dentist. People with car trouble have to call the mechanic to see if the work is done, and then call a neighbor to ask for a ride home. Working parents need to know if their children have arrived home from school; indeed, parents in windowless offices may need to consult the weather report first to know what instructions to give their children.

One survey of Fortune 1000 firms estimated that employees spent an average of 14.9 minutes per day on personal calls (about 3 percent of an 8-hour day), or the equivalent of 1½ work weeks of personal telephone calling per year. " The numbers may be suspect, since they are based on estimates by personnel managers, but they show that perception of a problem is widespread. As mentioned earlier, some telecommunications experts have estimated personal calling in the private sector to range from 10 to 50 percent of calls."

Despite the long-term decline in long-distance telephone rates, and the sharp decline since divestiture,[19] telephone costs remain a major expenditure for many firms. Technological tools that promise to further control these costs are attractive to managers, and vendors' assurances of reduced telephone costs have fueled the sales of call-accounting equipment and software.

Personal use of an employer's telephone has been called a "phantom job benefit. " Many people consider personal use of the telephone on their desk to be a reasonable perquisite, and the question of when this personal use becomes "abuse" is sometimes difficult to decide. Many people would agree that employees who place several hours of personal long-distance calls per day are outrageously misusing their employer's facilities. Many of the same people would think that an employer that doesn't allow parents to call home each day is insensitive to employees' needs. Reasonable behavior on both sides is somewhere between these extremes, but where should the line of "reasonable use" be drawn? Two local calls per day? Ten? One local call and one short long-distance call?

Often firms recognize a need to balance good management of the firm's resources with the biblical injunction against "binding the mouths of the kine that tread the grain. They are also aware of their own interest—there are other productivity factors to consider in addition to the cost of the telephone call. People's minds are clearer to focus on work if their personal problems are settled. Some calls simply have to be made, one way or another. It may be better for the firm's total productivity to let people take care of personal business during a short break at their desks than to require them to wait in line at the pay phone.

Organizations differ in their official policies of employee use of telephones. OTA interviewed telecommunications managers of several large firms. Some say flatly that office tel-

""Employees Spend Over One and A Half Weeks of Job Time on Personal Phone Calls Each Year, Nationwide Survey Reports, " Sandford Teller Communications for Accountemps, New York, Aug. 30, 1984.

[18]Judith Havemann, "Toll Calls Abused by U.S. Employees, " *Washington Post,* June 21, 1986.

[19]For example see "FCC Orders AT&T, Local Phone Firms to Lower Long-Distance Rate of Return, " *Wall Street Journal,* Aug. 8, 1986, p. 3.

ephones are for business use only. However, the view of one telecommunications manager was common, "We say company phones are for company business, but actually we don't care about local calls as long as they keep it reasonable. "[20] A few organizations had no problem with personal long-distance calls as long as they were of reasonable length and the employee reported the call and reimbursed the organization.

And of course, regardless of official policy, there is a wide variation in the enforcement of the policy. Offices that do not keep track of their telephone usage through call accounting have little idea whether the policy is being observed or not.

Even firms using call-accounting systems seldom find it cost-effective to evaluate every call to see if it is official. The common practice is to use the call-accounting system to generate 'exception reports, reports that indicate unusual call patterns that might result from misuse. Here is where the ability of the call-accounting system to track all calls by time and originating telephone, and then to corre-

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'('Interview with telecommunications manager of a financial services organization, December 1985.

late and process that information, becomes particularly important. For example, a number of long-distance calls from a department that has no out-of-state business might indicate that personal long-distance calls are being made. Many calls after business hours might indicate that the security or cleaning crews are making use of telephones. The call-accounting system may be programmed to produce a report of calls to certain prefixes, for example, in many cities, all 976 numbers are assigned to "audio text" services like "dial-a-prayer," "dial-a-joke," figure 11 shows a sample exception report of all calls over $5.00 in cost or 30 minutes in duration.

The use of exception reports to find major offenders is effective because most people actually make few personal calls. Despite estimates of the "average' amount of time spent on the telephone, common sense and evidence from a few studies suggest that there is a wide variation in personal behavior. For example, an examination was made of 1,400 unofficial long-distance calls (all to audio-text services) made from the U.S. Department of Education in Washington. The Department has about 5,000 telephones, but two-thirds of these audio-text calls came from just 41 telephones; 45 percent (650 calls) came from just 11 tele-

Figure 11 .—Sample Exception Report

Date: 03/07/84
Time: 11:48:33   Page: 1

Report Period: 2/24 - 2/29
Calls $5.00 or   30 min

Date	Time	Duration	Charge	Number called	Facility	City	State
		Extension: 226		User: Tom Best			
2/24	09:44	00:31:30	$ 9.45	714-964-6732	WATS	Anaheim	CA
2/27	13:57	00:36:30	.10		Incmg		
		Extension: 1466		User: Joseph Carr			
2/24	10:46	00:31:45	$17.00	616-983-5555	WATS	St Joseph	MI
2/24	15:19	00:35:30	0.10		Incmg		
2/27	12:37	00:17:32	5.99	212-888-1357	C/O	New York	NY
		Extension: 1533		User: Ellen			
2/25	09:54	00:22:26	$ 6.12	312-665-7863	WATS	Evanston	IL
2/27	15:33	01 :34:12	0.00	616-429-6589	LOCAL	St Joseph	MI
2/29	13:42	00:45:01	4.89	702-734-4444	MCI	Las Vegas	NV

phones.[21] Similarly, a 1984 study by the Department of Energy found wide variation in the level of unofficial calling in different offices.[22] Telecommunications managers have found that by relying on "exception reports" to seek out patterns of misuse, they are more likely to find habitual major offenders. This is also considered fairer than closely scrutinizing the telephoning habits of every employee.

Just the existence of a call-accounting system can have a deterrent effect on personal telephone use, even if management makes little

use of the reports. When employees are made aware that records are being kept, their personal use of telephones tends to go down. The reverse can also be true when they know there are no records. One firm interviewed by OTA removed its call-accounting capability for several months while making the transition from one telephone system to another. The total number of calls increased dramatically during that period, although it was impossible to tell from which phones the calls were made. Once the new system was running, each employee was sent a memo containing a reminder of company policy and a list of the previous weeks' calls from his or her telephone. Nothing further was necessary to cause the volume of callng to drop to its former levels.[23]

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[21] U.S. Department of Education, Office of the Inspector General, letter report ACN 11-40100, July 25, 1984. The 1,400 calls were made over a 12-month period from November 1982 to October 1983.

[22] U. S. Department of Energy, Office of the Inspector General, "Review of Abuse of Long Distance Telephone Service (FTS) in the Department of Energy," DOE/IG-0217, Mar. 22, 1985.

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[23] Interview with telecommunications manager, financial services organization, December 1985.

ACTIVE COST CONTROL METHODS

Active methods of telephone cost control can make use of technology to reduce the cost per telephone call and also to prevent unnecessary calling. Techniques include least-cost routing, calling restrictions or blocking, authorization codes and levels of service, and timed signals.

Least-Cost Routing

Least-cost routing automatically connects a call with the least expensive line available. Many modern PBXs are equipped with this feature, which requires a computer program to "hunt" through the available lines to find one appropriate for the call being placed. For least-cost routing to be most effective, the firm should first study its telecommunication needs to make sure that it has access to the proper assortment of different carriers (AT&T, MCI, and Sprint, for example) and different types of facilities (WATS lines, leased lines, and direct dial) to match its calling pattern.

There are at least 40 different ways to call from New York to Richmond, VA–each with

a different price.[24] Deciding which is the cheapest method of calling a given destination at a particular time of day can be a complicated problem, one which would be inconvenient for an employee to solve every time he or she needed to make along-distance call. The least-cost routing feature makes choosing the right route "transparent" to the user. The employee merely dials; a computer program searches through a table of available lines, times, and rates to pick the least costly route for each call.

At busy times of day, when the cheapest facilities are all busy, several options are available. The system may automatically queue the call, and signal the user when a line is free, or the system may signal the user to try again later. Yet another option is to give the caller a warning tone, indicating that the low-cost lines are all busy. If the call is urgent, the user can hang on, and the call will go through at a higher cost.

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[24] Interview with Edward Horrell, Mitchell & Horrell, Inc., June 24, 1986.

Calling Restrictions

The call-blocking feature allows modern telephone systems to be programmed to restrict the type of calls made by certain telephones or certain callers. For example, the switch may be programmed to block any calls to exchange "976" in order to restrict the use of "audio text" (weather, time, dial-a-joke) calls. Telephones in departments that do not deal with the public can be programmed to make only in-house calls. Telephones of workers with no out-of-town business can be programmed to provide only local service. Certain telephones can be authorized to make long-distance calls only via the lowest cost service, where others may be able to override the least-cost routing feature and make a long-distance call even when low-cost lines are busy.

Authorization Codes and Levels of Service

Telephone systems can also be programmed so that no telephone will put through long-distance calls unless preceded by an authorization code that should be known only to people authorized to make calls. The code also allows the system to charge the call to a particular person or account, which is useful for cost allocation purposes.

Authorization codes can form the basis for different levels of service. Workers with a need to make international calls can be assigned an authorization code that permits such calls. Those who only need to make calls within one State can be given a code that allows this more restricted level of calling. Similarly, the telephone system can be programmed to allow some classes of users to make calls by the lowest cost service only, while other users may have an "executive override" status that allows calls on higher cost lines if low-cost lines are busy. The State of New York, for example, has 26 different levels of service to accommodate needs of different classes of users.[25]

The advantage of authorization codes is that they are independent of the individual telephone instrument. A person who is authorized

to make long-distance calls may do so from any telephone in the system. The code is still valid if the user moves to another office. On the other hand, an unauthorized person cannot make calls on any phone, unless he or she discovers a code. In addition, authorization codes can be easily changed. For example, if the user's job changes to require a different level of service, or if it is discovered that an unauthorized person is using a code, the old authorization code can be canceled and a new one issued in short order.

A disadvantage of authorization codes is that they require the user to dial five to seven additional digits at the beginning of each long-distance call. This is annoying to most users and a real hardship for those who need to make many calls in a day. The State of New York has overcome this problem by making use of the speed dialing feature of modern telephone systems. Speed dialing allows the user to store a list of frequently called long-distance numbers (in some systems up to 60 numbers per user) in the telephone's memory. Each number is then referred to by a two-digit code. When calling any of these numbers the user must still dial the authorization code in full, but only dials the two-digit code to reach the frequently called number. Thus the total number of digits dialed per call is reduced to a manageable number.

Because authorization codes are generally used to allocate costs, they are usually used in conjunction with a call-accounting program.

Timed Signals

Several firms and government organizations use timed signals to remind callers of the time they are spending on telephone calls. Telephone systems can be programmed, for example, to give users a tone after some predetermined period–say 4 or 5 minutes. While no penalty accrues to the user who continues to talk beyond this point, the feedback is often useful in reducing the average length of calls.[26] People sometimes have no idea how long they have been talking, and a 5-minute warning reminds them that long-distance calling does cost money.

[25]Interview with Peter Arment, State of New York, Division of Telecommunications, September 1986. The 26 levels of service include both voice and data transmissions.

[26]Ibid.

STUDIES OF UNOFFICIAL USE OF GOVERNMENT TELEPHONES

Personal use of Federal Government telephones is not only contrary to "company policy" —it is illegal. The Federal Information Resources Management Regulation (41 CFR 201-38.007) specifically forbids the use of FTS or other government-provided long-distance service for personal reasons, and provides for fines, suspension, or dismissal of offending employees. Furthermore, 5 CFR 735.205 prohibits the use of government property generally for personal reasons. Some employees and contractors have also been indicted under Title 18, Section 641 (Public Money, Property, or Records), which provides criminal penalties for the theft of "a thing of value" from the government. For example, 4 employees and 25 contract employees of the Department of Energy were indicted for personal telephone use in 1981. Under a pre trial diversion, the defendants repaid the government $38,487.[27]

Despite the illegality, government employees use their employer's telephone for personal reasons just as much as private sector employees do; some would say more so. A number of studies conducted by individual departments in the past few years have found that an estimated 30 to 60 percent of long-distance calls are of an unofficial nature. A more recent study, part of a coordinated multi-agency audit, reported personal calls made up an average of 33 percent of off-network calls sampled in the Federal Telecommunications System (see below for a description of FTS off-network calls). About 20 percent of calls sampled on the government's commercial lines were personal.[28]

Some agencies' studies have also tried to estimate the loss to the government in terms of wages paid for time spent in personal calling. The Department of Energy, in its study of phone use, added to the $8 million per year cost of personal calls, an additional $6 million per year for lost wages. This was calculated by multiplying the total minutes of calls during work hours (8 a.m. to 12 noon and 1 p.m. to 5:30 p.m.) by the average wage rate for the department.[29] The figure is probably inflated as the calculation does not consider that employees could have made calls during their breaks or other slack periods when they had no other work. However, in the case of major offenders, for example a person running a private business from a government phone, wages lost to the government could be significant. In the Richland, Washington case mentioned above, the 29 defendants were required to repay lost wages along with other fines and the cost of the calls themselves.

The Federal Government is a major user of telephone services. Its Federal Telecommunications System (FTS), established in 1963, provides voice and low-speed data telecommunication services throughout the United States, the U.S. Virgin Islands, and Puerto Rico. The system contains about 1.3 million telephones, 1,600 local switchboards, 52 major switching centers, and 15,000 long-distance trunks. About 88 percent of the long-distance FTS service is through leased AT&T facilities, with the rest provided by GTE/Sprint, MCI, and other carriers.

The General Services Administration (GSA) manages FTS and supplies telephone service to most Federal agencies as required by the Federal Property and Administrative Services Act of 1949 (40 U.S.C. 481). Some of these are "full service agencies, " in that they receive all their telephone service through GSA. Others,

[27] U S Department of Energy, Office of the Inspector General, "Review of Abuse of Long Distance Telephone Service (FTS) in the Department of Energy," DOE/IG-0217, Mar. 22, 1985.

[28] Judith Havemann, "Listen Up Government Workers: You May Be Allowed One Phone Call, " *Washington Post,* Sept. 11, 1986. See also President's Council on Integrity and Efficiency, "Consolidated Report on Federal Telecommunications System (FTS) Utilization, " prepared by the General Services Administration, Office of the Inspector General, Mar. 16, 1987.

[29] U S. Department of Energy, office Of the Inspector General, "Review of Abuse of Long Distance Telephone Service (FTS) in the Department of Energy, " DOE/IG-0217, Mar. 22, 1985.

including Departments of Energy, Justice, Commerce, and the Veterans Administration, procure their own local telephone service in the Washington area, and rely on GSA only for long-distance services. These are known as "exclusive use agencies. "

There are three types of "long-distance" calls:

- A *commercial call* is made by dialing 9 from a government phone and accessing the local telephone system; intercity calls made after dialing 9 are billed at the regular commercial toll rate.
- FTS on-net *calls are* intercity calls between two government telephones.
- In *FTS off-net calls,* the originating telephone is part of FTS but the receiving telephone is not. In such a case, the call would travel as far as possible on FTS, and then would go off-network and use commercial lines to reach its destination.

Off-net calls are generally more expensive than FTS calls; commercial calls are most expensive. On many government telephones, a feature called Automatic Route Selection (ARS) automatically transfers commerical calls to the lower cost FTS network whenever possible. This is similar to the "least cost routing" feature discussed earlier.

FTS handled about 300 million calls in 1986 and cost the government about $500 million. Off-network calls represent about 65 percent of the calls and 69 percent of the cost. In addition, commercial toll calls cost about $15 million in 1986.

For FTS calls, GSA pays the long-distance carriers, bills the participating agencies quarterly, in advance, and then adjusts for actual usage. Usage figures for long-distance calls are currently collected by the telephone industry, using the Automated Message Accounting (AMA) systems of local telephone companies and long-distance carriers. The detailed call record includes the telephone number of the originating user, a billing account code, the date and time of the call, the telephone number of the called party, and the duration in minutes. Currently, call detail information is collected

on only a 20-percent sample of FTS calls one call in five. GSA uses the information in this sample to calculate quarterly telephone bills for each department, and also sends copies of the call records to agency telecommunications managers. Due to the large backlog of work in calculating telephone bills for all the agencies, AMA reports have been sent to the agencies 3 to 6 months after they are collected.[30]

Local calls are billed to each agency monthly through GSA's Telephone Inventory Accounting System (TIAS). Commercial toll calls are billed to agencies directly by the long-distance telephone companies.

The PCIE Review of FTS Utilization

The previously quoted figures on personal use of FTS came from an audit recently conducted by GSA at the direction of the President's Council on Integrity and Efficiency (PCIE). It is the most recent attempt by the Federal Government to study telephone use on a governmentwide scale. The study involved a statistical study of telephone use at 16 agencies **(basically an analysis of exception** reports). In addition, GSA conducted a call-back audit of a sample of telephone calls from 14 agencies.[31]

For purposes of the auditing project, GSA provided a sample of call detail listings of off-network and commercial long-distance calls to the Inspector General of each participating agency. These call records came from the regular 20 percent sample of FTS calls and from telephone company billings for commerical calls. Personnel from the Inspector General's office called back the numbers listed on those records to determine whether anyone at the destination telephone engages or has engaged in business with the department or agency making the call. Calls were then classified as "official, " "unofficial," or "unresolved."

[30]U S. Department of Education, Office of the Inspector General, letter Report No. 11-40100, July 25, 1984.

[31] President's Council on Integrity and Efficiency, "Consolidated Report on Federal Telecommunications Systems (FTS) Utilization, prepared by the General Services Administration, Office of the Inspector General, Mar. 16, 1987.

If the potential use of call accounting in government raises questions of privacy, fairness, and enforcement, a call-back audit, like the one conducted by PCIE, was even more controversial. Announcement of plans for the audit (in late February 1985) was greeted with immediate statements of concern by civil libertarians, union leaders, and others.

One concern was the potential for "selective disciplinary action against workers considered undesirable by agency managers."[32] When the PCIE study was announced, fear was expressed that, if the personal use of telephones was as widespread as GSA believed, then nearly every employee was to some degree guilty. This being the case, telephone audits could be used as a potential weapon against whistleblowers or other dissidents. One article noted that in 1982 "investigators in the Environmental Protection Agency secretly examined the agency's long distance phone records to determine whether Hugh Kaufman, a government employee who had disclosed information that led to the removal of most of the agency's top officials, had talked with news organizations."[33]

Union leaders also expressed the fear that information from the audit could be used to harass union members.[34] Nor were critical comments limited to labor groups. Bun Bray, president of the Federal Managers Association, called the audit "another little deal to punish Federal employees," and asserted that the savings from the program would prove 'insignificant and minimal.' "If they really want to save money, they ought to take those resources and check out General Dynamics and some of those other defense contractors that are ripping off the taxpayer," Bray said."

These topics along with other civil liberties questions, also attracted congressional atten-

tion. For example, Representatives Don Edwards (Chair, House Subcommittee on Civil and Constitutional Rights) and Patricia Schroeder (Chair, Subcommittee on Service) wrote to the Office of Management and Budget (OMB) requesting further information on the audit:

1. What is the source of authority for the proposed monitoring scheme?
2. How would the monitoring program be conducted, who would conduct it, and what types of telephone calls would be examined?
3. How long would the program last?
4. What types of data or analyses would the program yield?
5. How would the resulting data and analysis be used and who would have access to them?
6. What measures would be taken to limit dissemination of the data and analyses?
7. What guarantee is there that the program will not be used to discourage whistleblowers, to stifle dissent, to limit news media access to information, or for other political purposes?
8. What would happen to the data and analyses after the initial analysis is completed?

Our Subcommittees would like to be assured on these points, and any others that may be raised as additional information comes to light, before any monitoring begins.[36]

In his reply, Joseph R. Wright, Jr., Deputy Director of OMB, said the purposes of the PCIE review were "to reveal patterns of misuse of the Federal long distance telephone systems" and to develop "recommendations for systemic improvements in the management of these systems."

Wright also gave specific answers to questions raised by the congressional letter. For example, with regard to limiting dissemination of the audit data he said:

[it] will be limited to the staff of participating Inspectors General. The bulk of the data will be placed in audit workpapers and used to support audit findings which are sum-

[32]Bill Montague, "Planned Phone Audit Brings Blast From Several Groups," *Federal Times,* Mar. 25, 1985.
[33] David Burnham, "U.S. Phones Raise Issue of privacy: 'e" Equipment Would Provide Detailed Records of Calls," *New York Times,* Mar. 17, 1985.
[34]Bill Montague, "Planned Phone Audit Brings Blast From Several Groups," *Federal Times,* Mar. 25, 1985.
[35]Ibid.

[36]Mar 13, 1986 letter from The Honorable Don Edwards and The Honorable Patricia Schroeder to Joseph R. Wright, Jr., Deputy Director, Office of Management and Budget.

mary in nature, Any data which require initiation of an investigation will be treated as evidence and will be accordingly protected. Data which may bring together names and numbers will be filed as part of the IGs' Privacy Act systems of records.

On the question of whistleblowers or the stifling of dissent, Wright reassured the committees that:

. . . long distance calls to news media, congressional offices, public interest groups, etc., will be considered business calls for the purpose of this review. . . .

The review is being performed by statutory Inspectors General who have, among other duties, responsibility under their own enabling legislation to protect whistleblowers. In addition, the Civil Service Reform Act clearly prohibits the kinds of activities described in your question . . . while there are no absolute guarantees that all persons will act properly, there are ample procedures to deal with those who are found to have committed such prohibited personnel practices. . . .

Representatives Edwards and Schroeder replied to Wright, indicating their appreciation that the PCIE "is sensitive to preventing unwarranted disclosures of information collected in any audit and avoiding invasions of privacy. " Drawing on concepts in Wright's letter, and their own sense of proper elements to go

into guidelines for the audit, the two Members of Congress suggested a number of principles to be included in those guidelines.

A detailed memorandum of "Guidance on the Privacy Act Implication of the PCIE Review of Federal Telecommunications Systems (FTS) Utilization" was completed in August 1985. This document included many of the principles outlined in the Edwards-Schroeder letter, as well as safeguards discussed by Wright. These guidelines were adopted as the PCIE audit progressed through 1985 and 1986.

Results of PCIE Audit

The PCIE audit, conducted by the Inspector General's office of each participating agency, made use of a sample of call detail records supplied by GSA. They included both "off-network' FTS calls and commercial telephone calls. Researchers called each destination number in the sample to determine whether anyone at that location engaged in business with the department or agency making the call. At the conclusion of a conversation with the person or persons at the destination, calls were then classified "of ficial," "unofficial, or "unresolved."

Table 9 shows results of the FTS off-network sample. The weighted average (based on the

Table 9. —Results of FTS Intercity Off-Network Call Sample by Agency

Agency	Estimated calls (°/0)	"Unofficial minutes (°/0)	Traffic cost (O/.)
1, Department of Agriculture	30.5	26.5	23.6
2. Department of Commerce.	25,5	40.0	37.9
3 Department of the Interior	29.5	40.4	35.6
4. Federal Bureau of Investigations.	26.5	30.0	25,1
5. Department of Labor ., ...	45.5	45.1	44.8
6. Department of Treasury.	42.0	45.3	41.1
7. Office of Personnel Management	36.5	41.1	38.9
8 General Services Administration	39.0	49.7	47,5
9. Environmental Protection Agency	29.0	23.3	22,2
10 Small Business Administration	27.5	39.8	34.9
11, Department of Health and Human Services	35.0	28.7	25,7
12 National Aeronautics and Space Administration .	41.0	48.3	43.2
13. Department of Housing and Urban Development .,	27.0	36.5	33.2
14. Department of Education ... ., .,	28,5	41,0	36.8
Simple average	33,6	36.4	33.3
Weighted average	33.6	36.4	33.3

SOURCE Presidents Council on Integrity and Efficiency, "Consolidated Report on Federal Telecommunications System (FTS) Utilization prepared by the General Services Administration Mar 16 1987

Table 10.—Results of Commercial Long-Distance Call Sample by Agency

Agency [a]	Estimated calls (°/0)	Unofficial minutes (°/0)	Traffic cost (°/0)
1. Department of Agriculture	10	3.3	2.3
2. Department of Commerce.	26	31.1	25.5
3. Department of the Interior	6	1.0	.6
4. Department of Labor	40	49.3	40.2
5. Department of Treasury.	14	11.3	8.3
6. Office of Personnel Management	34	17.2	15.3
7. General Services Administration	26	14.4	3.6
8. Environmental Protection Agency	18	6.2	2.6
9. Small Business Administration	46	40.6	42.5
10. Department of Health and Human Services	22	15.8	15.1
11. National Aeronautics and Space Administration	14	18.5	12.4
12. Department of Housing and Urban Development	36	36.8	35.8
13. Department of Education ., ... , .,. . . .	44	28.6	25.3
Simple average	25.8	21.8	14.6
Weighted average.	19.9	15.8	11.0

[a]Federal Bureau of Investigation did not participate in the audit Of commercial telephone calls.

SOURCE: President's Council on Integrity and Efficiency, "Consolidated Report on Federal Telecommunications System (FTS) Utilization, " prepared by the General Services Administration, Mar 16, 1987

size of agencies) of the number of unofficial calls found was 33.6 percent. These calls made up 36.4 percent of the total telephone time sampled, and 33.3 percent of the total cost of the calls sampled.

Table 10 shows that use of commercial lines was quite different. The number of calls was smaller, with a weighted average of 19.9 percent of the sample being classified as unofficial. In addition, these calls made up only 15.8 percent of the total time of commercial calls sampled and only 11.0 percent of the cost. This would suggest that many of the personal commercial calls were short duration or low-cost calls.

An estimate of the cost of personal calling to the government could be developed by comparing the cost of the personal calls in the sample to the relevant portion of the government telephone. For example, 33.6 percent of the $345 million spent for FTS off-network calls is $116 million, 11.0 percent of the $15 million spent on commercial calls is $1.6 million. Thus,

simple extrapolation from the audit would suggest that personal calling cost the government around $118 million in 1985.

While this extrapolation gives a rough estimate, there are a number of reasons why it may offer a distorted picture of personal telephone use in the government. For example, calling patterns in Washington may be quite different than those in other areas of the country, so that personal use statistics found in the audit should not be applied to the entire Federal telephone bill. Locations outside the Washington area were not included in the PCIE audit. However, two agencies, the Departments of Defense and Energy, sampled some areas outside Washington at the same time as the PCIE audit. These agencies found unofficial use ranging from 40 to 50 percent, suggesting that personal use in Washington may be the same or a little lower than elsewhere in the country. However, the results are not strictly comparable because the sampling technique and study methodology were different.

FUTURE DIRECTIONS FOR GOVERNMENT TELEPHONE MANAGEMENT

Need for New Policies

Most of the questions raised by the audit still remain open. The exchange of letters between Congress and the Office of Management and Budget resulted in modified guidelines for the PCIE audit conducted in 1985-86. In addition, OMB issued guidelines related to handling of call detail records under the Privacy Act. However, the question of the basis for future permanent guidelines on the management of the government telephone must still be resolved.

The government has been collecting call detail information for long-distance calls for a long time. The recent audit relied on no new technology. A similar audit could have been conducted at anytime in the past 10 years. As mentioned above, GSA provides its 20 percent sample record to all government agencies, although the agencies do not always use this detailed call information on a regular basis. The government has used this information when there is sufficient need or motivation. For example, examination of long-distance telephone records was an important element in the investigation of Department of Commerce employees suspected of using "inside information" in stock trading deals. A number of employees were required to reimburse the government for long-distance calls as a result of that investigation.[37]

The opportunity to create a usable government policy on telephone use is especially important in the light of the development of a new long-distance system to replace FTS, and in the light of plans of a number of agencies to take control of their own telephone management. Several, like the Departments of Transportation and State, have already begun procuring their own local service for their headquarters offices. In most cases, these agencies have also purchased or leased new telephone equipment, including switching

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[37]John M. Berry, "Three Commerce Employees Fired for Profiting From Data," *Washington Post,* June 13, 1986, p. 1.

equipment with call accounting, call blocking, and other modern features. Developing and implementing a governmentwide policy may become increasingly difficult as the system becomes more fragmented. GSA, as the governmentwide telecommunications manager, is currently trying to revise policies related to long-distance telephone use.

A number of major questions need to be decided on a long-term basis. How will personal use be defined, and what level of personal use will be tolerated? Will there be a continuing role for audits, such as the one recently completed? Will local calls be included in future audits? What will be the policy toward long-distance calls to suburban areas? What can be done to ensure employees proper access to the press, to union representatives? Can a sufficient level of protection be given to call-accounting records to prevent their misuse? What role, if any, will service observation or other types of "listening in" play in government telephone management? What alternative kinds of management techniques are appropriate for use on government telephones? These questions are addressed in the following sections.

Establishing a Policy on Personal Use

GSA has been struggling to develop a successor to the current policy of "no personal calls. A number of alternatives might be considered. This section will discuss only long-distance calls, which are the main focus of concern. Local calls will be considered later.

One approach would be to allow personal long-distance calls at the government's expense under certain circumstances, for example in case of accident or illness, to check on babysitters, or transportation arrangements. The problem here is to create a list that eliminates frivolous calling, but still covers all reasonable circumstances, including some as yet unforeseen.

Another approach would be to allow workers to make private long-distance calls on FTS on a cost-reimbursement basis, as is the policy in some private firms, universities, and State agencies. The problem with this approach is the possible bookkeeping burden that could be created for an organization as large as the Federal Government. It would be necessary to establish a method for identifying personal calls, billing employees, and collecting money. Organizations that allow reimbursement tend to be small offices with a collegial atmosphere; identification of personal calls is basically an "honor system, " reinforced by supervisory review of monthly call records. Usually, a printout of calls is circulated among the staff each month so that each person can initial his or her personal calls. While this approach makes it possible for employees to use the telephone freely, and provides reimbursement to the employer, it does not protect privacy. Not only supervisors, but everyone in the office typically sees the printout and could, if they were interested, make note of who called whom.

Using a call-accounting system, it would be possible to develop a private printout or "telephone bill" for each worker's telephone. However, identifying personal calls might still be a problem. Workers would be "on their honor" to claim personal calls; those with a poor memory or an underdeveloped sense of honor would still make calls at the government expense, unless some sort of regular audit were made.

Collecting payment for calls would require the creation of an administrative structure and would generate costs that would have to be passed on to the users, thus raising the cost of the calls. Presumably this would be little different from other instances (bookstores, cafeterias) where government employees pay cash for a service; however, in most cases these are usually provided by contractors rather than directly by the government. It is not likely, in any case, that agencies will want to go into the "telephone business" on a regular basis for their employees.

Another approach would be to allow government workers to make personal long-distance

calls from the telephones on their desks as long as the calls are bill to a home number or personal calling card. This approach is quite feasible now, given the near universality of calling cards. However, it may be considered illegal, since current regulations prohibit the personal use of the government telephone as well as FTS. Billing calls to a home number is technically possible from many government phones and could be made possible from the others. The costs to government of such a policy would be primarily in terms of employee time (for calls not made during lunch period or break).

Because many personal calls may be calls home made by Federal workers traveling out of town, GSA has advanced a proposal to allow each Federal worker one call home per day of travel. This practice is held to be typical of personnel policies in private businesses. GSA has estimated that the cost of such a policy could be as high as $100 million per year, based on the total travel days of Federal workers. It is not possible to tell how many personal calls are currently made by traveling workers, thus it is not known how much moving this particular type of call from the "prohibited" to the "permitted" category would affect the level of personal use of the system.

Exception Reports and Personal Use

Telecommunications managers in many private and State government telephone systems have found that the use of "exception reports" is the most effective way to discover patterns of personal use. The computer software is used to select and report on calls that have a high likelihood of being unofficial, for example, calls to audio text numbers, calls at unusual times or to unusual destination areas, long or reoccurring calls. The ability to use computer software to identify only larger instances of possible personal use would also seem the most cost-effective approach. Call-back audits, if it is decided they are appropriate, could then be conducted in those specific cases where a pattern of prohibited personal use was suspected, rather than as a general approach to telephone management.

Use of exception reports requires decisions about the thresholds below which possible personal use can be tolerated or at least disregarded. This is generally not a problem in the private sector, where it is a management decision, tempered perhaps by the "corporate culture. But in the Federal Government, there is at least the philosophical difficulty caused by the fact that any personal use is not only contrary to policy, but illegal. Even if some tacit threshold of "reasonable personal use" were implemented, questions of equity might still be raised. People who were caught exceeding the threshold could claim they are being treated unfairly because "everyone else" is also guilty to some lesser degree.

Many agencies are not currently equipped to manage their telephone systems using exception reports. While some agencies may be making regular use of the call detail records provided by GSA, others are not. One Department of Education study noted that the printout exceeds 1,000 pages per month; there is insufficient staff to study the printout on a regular basis; in some cases the reports have remained in unopened boxes for months.[38] Similar complaints have been voiced by Department of Energy and the General Accounting Office. A simple listing of detailed call records is generally of little help as a telephone management tool. The information requires further computer sorting–by extension, frequently called numbers, long calls, etc., in order to be of much use. Several agencies are making use of call detail information from GSA, from their own telephone systems, or directly from telephone companies to develop their own exception reports.

GSA is currently planning to make call detail information from its 20-percent sample more useful to agencies by providing exception reports to agencies using FTS service. GSA is also investigating ways to make call detail data available to some agencies in machine-readable form so they can more easily use their own computers to sort the information and develop management reports.

[38]U.S. Department of Education, Office of the Inspector General, letter report ACN 11-40100, July 25, 1986.

Of greater importance for the government w-ill be establishment of clear guidelines for the handling of exception reports and other computer-based call records to protect the privacy of employees and to prevent any possible misuse of these records by supervisors or others within the government.

Future Use of Call-Back Audits

One major question in the future of the government continuing telephone management is how or whether call-back audits will be used on an ongoing basis. One major purpose of the recent PCIE pilot study was to provide a benchmark of current telephone system usage. The primary reason, however, was to develop methods for detecting personal use in the future. There will likely be strong arguments to make call-back auditing a regular feature in Federal telephone management.

The PCIE pilot study was coordinated by GSA, but the actual audit was done by the Inspector General of each participating agency. Each of these agencies is issued its own report and is developing its own action steps to improve management of its telephone system. While GSA is the governmentwide manager of FTS, agencies have considerable discretion in correcting their own problems.

It is possible that within a few years, PCIE will want to conduct another multi-agency study in order to compare the results to the recently completed study. Even if this is not done, a number of individual agencies may decide to undertake studies on their own, using the techniques developed in the PCIE pilot study.

Even more likely is that agencies will want to use a modified version of the call-back audit on a regular basis to complement their exception reports. Agencies that create exception reports to identify patterns of "suspicious calls (e.g., unusually high number of calls, unusually long calls, calls to unusual area codes) could use the call-back method to determine whether or not they are legitimate.

This use of the method still raises some questions concerning the privacy of telephone users. However, it has the advantage of affecting a smaller population—only those whose calls are "suspicious," rather than the entire work force. This approach has some appeal, since it targets investigation at specific cases of suspected misuse rather than placing the entire work force under suspicion. As mentioned in an earlier section, it would be necessary for the agencies or for GSA to establish guidelines for determining when a calling pattern warrants investigation.

Local and Suburban Calls

An additional question arises about the ongoing policy with regard to local calls. The recent PCIE audit did not cover local calls, and GSA does not collect detailed information on local calls on a regular basis and has no plans to do so (such information could be obtained from local telephone companies if especially requested and paid for). In their second letter to OMB, Reps. Edwards and Schroeder expressed the opinion that the government "should not procure or install any service, feature, equipment or system that would permit it to obtain call-accounting data on individual local calls. " New equipment being purchased by some departments will have the capability to record detailed information on local as well as long-distance calls. In some agencies, it is programmed only to report time and duration of local calls, not the destination telephone number. At the present time there is no governmentwide policy on this topic, and individual departments have to choose how to make use of this feature of the equipment. A governmentwide policy on this topic would be useful.

Local calls generally make up a much smaller proportion of telephone costs than long-distance calls, but they are not completely cost free. Besides the "message unit" charge by the local telephone companies (7.5 cents per call in Washington), there is the cost for additional telephone lines if the volume of personal calls gets too high. In addition, there is the question of employee time.

The private sector telecommunications managers interviewed by OTA, however, expressed no interest in accounting for local calls. They saw excessive local phone use as a management problem, but not a *telephone* management problem. One said, "That's up to the managers and supervisors. If their people are on the phone all day, incoming calls can't come in, so they tell them to keep it short. "[39]

Calls to nearby suburbs will require separate consideration. These calls may be functionally the same as local ones, but are long-distance calls due to the arbitrary boundaries of local service areas. In the Washington area, for example, employees who telephone from downtown Washington to their homes in Bethesda, MD, are making a local call, but those who call home to Herndon, VA, are making a commercial toll call. A large number of the personal commercial calls discovered by the PCIE audit probably fit into this category. This would account for the relatively short duration and low cost of calls shown in table 10–many of them were brief personal business calls of the "checking on the babysitter" variety. The government might decide to allow these employees one call or a reasonable number of calls per day, as discussed above. On the other hand, the government might take the position that the cost of calling the suburbs, like the cost of daily transportation to the suburbs, is the employee's responsibility, and might provide resonable means (pay phones or the use of calling cards) for employees to make these calls at their own expense.

Calls to Press, Union, or Public Interest Groups

The policy of the PCIE pilot study was to treat any call to a press organization, public interest group, congressional office, or labor union as "official business" without further

[39]Interview, May 1986, with the telecommunications manager of an insurance firm.

examination. However, as Reps. Schroeder and Edwards point out,

> . deeming such calls "official" does not address . . . the fact that the Government will be able to determine who has called whom. The availability of such information and the ready means to analyze it remain in our minds the most troubling-and as yet unresolved— aspects of the PCIE proposal.

The question of how these calls will be treated on an ongoing basis remains open, and gives rise to the further question of who will have access to call-accounting records.

There seems to be little doubt that the information in telephone call detail records could be used to identify and possibly harass whistle-blowers, people who speak with the press, union organizers, and dissidents. While harassment of such people is a violation of the Civil Service Reform Act, use of time and attendance records, for example, to harass whistle-blowers does take place.[40] New technology call-accounting software makes it much easier than in the past to isolate the calls made from particular telephones.

If call accounting and use of audits must be used to protect the government investment in its telephone system, it may also be necessary to take positive action to protect the civil liberties of telephone users. This protection might take the form of clear and enforceable regulations to protect the privacy of call-accounting records. This kind of transactional data about telephone calls, while probably not as personal as the content of the calls themselves, does warrant protection.[41] Regulations may be needed to ensure that information remains under control of telephone system managers, and perhaps inspector generals, who need it to manage the telephone system, and that data is not available to supervisors or other managers who deal directly with employees.

[40]Myron Peretz Glazer andd Penina Migdal Glazer, "Whistle blowing, *Psychology* Today, August 1986; Donald E, Soeken, "J'accuse," *Psychology Today,* August 1986. Also, interviews with Donald E. Soeken, February 1986.
[41]U.S. Congress, Office of Technology Assessment, *Federal Government Information Technology: Electronic Surveillance and Civil Liberties, OTA-C IT-293,* (Washington, DC: U.S. Government Printing Office, December 1985).

In the absence of clear policies and procedures regarding who has access to this information and what they do with it, the possibility for misuse of the information is great. The challenge is to develop procedures that will protect the privacy and first amendment rights of Federal employees, without unduly hampering investigation into cases of wrongdoing.

Eavesdropping and Service Observation

The PCIE study did not in any way involve the content of telephone calls. "Service observation" –listening into employees' dealings with the public-is practiced in Federal Government offices such as the Veterans Administration, Internal Revenue Service, Social Security, and other agencies with customer service responsibilities. Federal Information Resources Management regulations require Federal agencies to notify both employees and the public that service observation may take place, although there is no requirement to signal that an observer is on the line.

Eavesdropping on other types of calls as a strategy to reduce personal use of telephones is of questionable value and legality. The instances where Federal managers have been found recording or eavesdropping on conversations for any purpose have caused public indignation. One recent incident prompted the introduction of legislation to specifically prohibit listening in on or recording conversations on the Federal telephone system, except in specified instances such as service observation programs (H.R. 502, 99th Cong., Federal Telecommunications Privacy Act of 1985).

Further, as is discussed in chapter 4, in at least one case in the private sector, a court has ruled that an employer's listening in on an employee's private telephone conversation is eavesdropping and a violation of Title III of the Omnibus Crime Control and Safe Streets Act (18 U.S.C. Sec. 2510), even though the employee was using a telephone normally included in a service observation program.

Aside from the privacy and legal questions, eavesdropping would also be a costly and im-

practical means of managing a telephone system. It would probably be unfair, as well, since only a few workers' calls would be affected.

Other Methods of Cost Control

Finally, given that government agencies will be procuring new telephone equipment and services over the next few years, it would be prudent to consider the use of other methods of telephone cost control that may supplement, or even replace, call accounting as a means of controlling the costs of personal calls. It should be possible, given the right technological and administrative tools, to greatly reduce the number of unwanted or unauthorized calls.

One approach is education. Many employees actually believe that calls on FTS (or an employer's WATS lines in the private sector) are free. The belief has developed over years in which no accounting was made, where widespread personal use was tacitly tolerated, and where employers and agencies *themselves* have treated telephone service as a free good. The PCIE audit has been a first step in demonstrating that the government policy is changing.

A first step in changing the calling habits of government workers might be a nonpunitive educational campaign to inform employees of the new policy on personal calls once that policy is developed. This campaign should include information on the methods of call accounting that are being used. As mentioned earlier, the mere knowledge that an effective recordkeeping system is in place has a dampening effect on personal calling. Educational efforts should also fully inform government workers of the kinds of calls that are permitted, and inform them of alternative means of making necessary calls not permitted on the government telephone system.

Education programs with respect to telephone use can be effective. Agencies have found that they reduced their employee's level of misuse (use of an expensive facility when a cheaper one is available) through educational

programs aimed at increasing use of FTS and reducing use of commercial lines.[42]

The other strategy is to make use of active cost control measures discussed earlier in this chapter, for example "blocking" and "level of service access" features. Designing a telephone system that is best suited for doing the government's business might be preferable to scrutinizing call records to catch government workers who misuse a poorly designed system. As mentioned earlier, modern telephone systems do allow for the programming of different levels of service, depending on the telephone needs of the end user.

The government currently has some capability in this regard, but it is not used to a great extent. There are five levels of FTS telephone service available; these affect only the end user's ability to make outgoing calls, not the ability to receive incoming ones. The levels are:

1. *Standard Service: Can call* only government telephone in local area.
2. *Commercial Service: Can* call government local telephones and commercial lines (dial 9). This includes the ability to access commercial long-distance lines after dialing 9.
3. *Government Service: Can* call local and intercity government telephones, but no commercial lines.
4. *National Service:* Full access to both government and commercial telephone networks, but no international dialing.
5. *International Service:* Full access to Government and commercial networks and international dialing.

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[42]See for example, U.S. Department of Education, Office of the Inspector General, "Report on Review of Telephone Changes, " Sept. 11, 1981.

According to GSA, the distribution of these levels of service among government full-service agencies was as follows:

Level of service	Main lines	
1 . S t a n d a r d	881	(0.6%)
2. Commercial service	532	(0.4%)
3. Government service	242	(0.2%)
4. National service	36,267	(25.6%)
5. International service	82,955	(58.7 To)
No level	20,443	(14.5%)
Total	141,320	(100.0%)

The "no level" category refers to lines that could not be classified or were installed before the classification went into effect.[43]

As shown above, 84 percent of the lines are in the two highest levels of service. While it is possible that such a large number of Federal workers need access to the full range of national or international telephone service, it is likely that the actual number with a business need to make extensive long-distance calling is lower than 84 percent. In the past, the relative difficulty of changing the level of service on a given line once it was installed made it difficult to assign specific levels of service to specific types of users. To ensure that telephone service would be at least adequate to the needs of any group of workers stationed in a particular office, lines have usually been assigned a fairly high level of service.

However, new digital telephone systems will have greater flexibility and could allow more extensive use of programmed levels of service that can be changed as needed. Meaningful levels of service that reflect the calling patterns of government workers would have to be developed, and individual agencies would need to determine which of their employees need access to commercial lines, which to FTS lines, which to off-network destinations via FTS lines, and so on.

Restrictions might also be assigned to the telephones themselves, or to their users, based on authorization codes. Both approaches have their advantages and disadvantages. Authorization codes are more flexible, since they depend on user needs rather than the location of a particular telephone he or she is using at the moment. On the other hand, authorization codes require users to dial additional digits, which can be a burden on those who make many calls unless speed dialing is available. Assigning restrictions to specific telephones would require that levels of service be changed every time offices are changed; this is possible with new digital telephone systems.

It maybe that the government will want to pursue both options on an agency-by-agency basis. In some agencies, the telephones may restrict long-distance calling except for holders of authorization codes. In other areas where authorization codes are unworkable, such as teleservice centers where employees make many calls all day, telephones can be programmed so that codes would not be needed. Other agencies may decide to assign levels of service to telephones rather than to an individual via authorization codes. Some possible levels of service might include:

- *Local Government Service:* Can call only government phones in local area.
- *Local Service: Can* call local government phones and commercial (dial 9) lines. PBX or local telephone company Centrex blocks long-distance access.
- *Government Long Distance Allowed:* All above plus access to FTS.
- *Off-Net Long Distance Allowed:* All above plus ability to call nongovernment phones via FTS.
- *Commercial Long Distance Allowed:* All above plus access to commercial long-distance network.
- *Range Authorization:* Users in the previous three categories could be limited to calls in certain area codes or zones within the country.
- *International Calling:* All above plus international direct dialing.

[43]Information taken from President's Council on Integrity and Efficiency, "Consolidated Report on Federal Telecommunications System (FTS) Utilization, prepared by the General Services Administration, Office of the Inspector General, Mar. 16, 1987.

[44]List developed by OTA based on categories in "Detailed Description" manual of State of New York, Office of General Services, Division of Telecommunication.

Clearly, establishing better levels of service will not eliminate personal calling. It is still possible for the holders of authorization codes to make personal calls, to the extent allowed by their assigned level of service. Similarly, should levels of service be assigned to specific telephones, it is possible that the people sitting near telephones capable of making long-distance calls will use them for personal calling. However, a call-restricting approach could reduce the number of unofficial calls made on the government's telephones. The State of New York found that many employees do not need to make long-distance calls in the course of their work and therefore do not need authorization codes. Only 60,000 codes are in effect (there are 200,000 employees at locations served by the State telephone system). While codes are sometimes shared among members of a small workgroup, it is still clear that not every employee needs access to long-distance service at work. Only about 20 percent of codes assigned have a level of service that permits full national or international dialing privileges. The other 80 percent are restricted to government calls, off-network calls within the State, or commercial calls within selected area codes. Determinations about employees telephone needs are made by the individual agencies, not by the Division of Telecommunication.[45]

The Federal Government's telephone system must be nationwide and must serve many different agency and program needs. However, it appears that the principle of reducing the government's exposure to risk of unauthorized calls by reducing the number of employees with access to full-service telephones is a valid one.

GSA, as the governmentwide manager of the telecommunication system could greatly aid agencies in making use of new information technologies in two ways. First, it could continue, through its own research, to develop model methods for telephone system management and communicate these to the agencies. Second, it could serve as a clearinghouse for sharing innovative and useful approaches developed by the agencies.

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[45]Interviews with Peter Arment, State of New York, Division of Telecommunication, September 1986. It should be noted that the State of New York does use call accounting. Authorization codes are the backbone not only of the service levels, but also of the billing system. Long-distance calls are charged to the authorization code, so the call is billed to the proper department, even if the call is made from another office, or even from a State office building in another city.