When the Public Goes Private

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ABSTRACT

This paper analyzes the telecommunications policy choices of governments using private networks for their own internal communications needs and, increasingly, for delivering services to clients. It considers the importance of governments as the largest telecommunications users in America. The paper then analyzes federal decisions about FTS 2000, the world's largest private network. I then analyze state government choices, with a detailed focus on New York, and shorter descriptions of Indiana, Minnesota, Maine, Wyoming, Georgia, Iowa, Nebraska, New Mexico, and Illinois. Since local governments are increasinly involved in establishing telecommunications networks, I consider a few local government cases as well.

The paper discusses whether government should be acting as "just any other user" or whether they have special obligations to the nation's telecommunications infrastructure, at least in terms of the public switched network. Generally, telecommunications policymakers should pay more attention to government network choices in a strategic sense, not simply as a short-run minimisation of cost inputs.

Introduction - Government as a User

The federal government is by far the largest employer in the United States. In addition, more than one in seven working Americans are employed by state or local governments. A very large percentage of employment in the American economy, and in that of other nations, is comprised of government workers. Similarly, a very large share of telecommunications usage is generated by governments at all levels. A broader conception of government that includes public universities, public health care facilities, libraries, and other related public and not-for-profit enterprises, makes their choices even more important to telecommunications providers. Government choices about usage privatization, in terms of establishing private networks, are thus important simply in terms of the scale of the government enterprise.

These choices are also important when we address the question of whether governments should act differently than private enterprises in establishing private networks. If government policy generally is to encourage development and usage of the public switched network, as the basic infrastructure for all telecommunications users, and particularly for small business and residential customers that can not establish private networks, then a conflict exists. Do governments have a responsibility to consider more factors in these choices than do large private corporations? This is a normative question that will be raised but not answered conclusively in this paper. The paper does

attempt to answer the positive question of what choices governments actually have made, what factors have contributed to those choices, and the effects to date of such decisions.

It is certainly true that American federal and state governments are relatively sophisticated users of information and data processing technology. For example, in terms of computer access, recent data show that the federal government is on top and state governments are about in the middle of the pack, while local governments trail, compared to businesses access to computers. From 1989 statistics from the Gartner Group on the number of deskworkers per computer, by SIC code, the U.S. average is 2.94. The most computerized group is the federal government with a figure of 2.56. The next categories (by SIC code) are business and legal services 2.88; durable goods manufacturing 3.17; agriculture, mining and construction 3.55; wholesale trade 3.63; nondurable manufacturing 3.65; state government 3.79; transportation and public utilities 4.07; finance, insurance and real estate 4.33; services other than health and education 4.55; health 5.0; local government 6.10; and retail services 6.71.

Why the Public Goes Private

Several governments have established their own networks, to consolidate traffic over one network, to achieve cost savings by avoiding access charges, and for other reasons. Sometimes the government itself owns a significant portion or all of the network, including switches and other facilities, and other times they lease most of the facilities from telephone providers.

There is great variance on the degree of ownership. The federal government now buys services in a long-term contract with AT&T and US Sprint in their FTS 2000 network. Many state governments have similar contracts; in 1989, according to Caudle et al, state governments leased their complete systems in Florida, Texas, Connecticut, Maryland, Montana, and New Hampshire. State networks are owned completely in Oklahoma and South Carolina. Several states utilize mixed networks. Washington state owns the switches in its network but not the lines; the Arizona network is state-owned where feasible; Colorado owns the Denver portion of its network; Utah owns 40% of network facilities; and Kentucky is switching from leasing to owning. Caudle et al (1989: 61) note: "The decision to own or lease has been a difficult one in most states. Changing user demands, rate structures, and needed management skills do not facilitate clear-cut decision-making."

Governments with a mixed network have more direct control over disaster recovery planning than those with fully leased networks. For example, to achieve redundancy, Wisconsin has both leased and owned fiber optic cables in Madison (Richter 1991c: 44).

There are several reasons that justify establishing separate government networks. Probably the most important is cost advantages. As with other private networks, not using the public switched network means avoiding access charges that are usually higher than cost, and which help contribute to lower rates for other consumers, especially for residential access. Generally

real costs savings are the most important motivation and justification, and one which many state officials see as their duty to pursue even if there are other costs when viewed from a broader perspective. For example, although local telephone companies will be losers in the short run from loss of this traffic, residential rate payers in the state, who are also taxpayers, will lose in the longer run, if the state network is not providing "economic" bypass. Given the size of some large government networks, the bypass may indeed be economic, however.

In reality, GAO analysts have recented argued that the largest government network, FTS 2000, may actually not be saving money relative to rates charged to large users. This is not clear, but cost savings appear to be the major goal of government networks, especially in these times of severe revenue shortfalls at all levels of government.

Second, some governments establish their own networks with concerns about security and privacy for certain sensitive operations. This is most obviously justifiable for national intelligence gathering organizations like the CIA or FBI. It may also be a factor for state criminal justice organizations and even for social service or health providers. For example, although cost was also a factor, CRIMNET in New York is a private network shared by the criminal justice agencies, which has not joined the larger state government network, EMPIRENET. Other state criminal justice agencies have also had their own private networks.

Third, some governments have developed a single large gov-

ernment network because they realized that several of their agencies were already doing so on their own, for any of the above reasons or because of the bureaucratic tendency towards building fiefdoms by expanding organizational control over a larger domain. In terms of coordination, if each agency made different choices about providers, services, and standards, then they might have difficulty interconnecting in a meaningful way. Thus, these states have stepped in to provide a central coordination role and to achieve greater control over their total telecommunications operation.

Fourth, private networks may provide some special features for governments that can not easily or cheaply be provided over the public switched network, particularly in terms of redundancy. Often private networks retain an "option demand" to use the public switched network, should their own system fail. Or, with new technology and attention to this issue, extra redundancy may be built-into the separate government networks from the start, as Iowa is doing with its TIM system and Massachusetts is doing with CommNET (Richter 1991c: 49-50). The recent problems all over the nation with the implementation of Signaling System 7 illustrate why large users are so concerned about network failures. Still, as Richter (1991c: 37) notes: "only one in five state and local governments has a comprehensive plan for restoring its information networks in the event of a disaster." Partly this is because, in a time of state budget crises, "Disaster recovery may not rank too high on a politician's list of favorite programs,"

according to Tim Johnston, Oregon's telecommunications manager (Richter 1991c: 39). The relationship of critical providers like the FAA and the FTS 2000 system has recently become controversial in light of reliability concerns.

Fifth, governments may implement private networks to provide a strategic advantage, in terms of delivering services to their clients more effectively. Networks that are built explicitly with client service in mind may achieve more cost savings, productivity and service quality than can purchasing services from the public switched network.

These are all valid reasons for private government networks and probably parallel private corporations' justifications fairly closely. However, in addition to the "taxpayers are also ratepayers" argument that short-run savings to government may reflect long run costs to telephone ratepayers (not an arguement that has much political salience, however, as cost savings are immediate and traceable to individual political actions, while rate increases are longer term and less traceable), there is another reason for governments, especially states, to consider utilising as much as possible the public switched network. This has to do with the external benefits from improving the public switched network, particularly in rural areas that might otherwise not be modernized or upgraded as quickly. This is an infrastructure justification with parallels to public transportation choices to provide highway, railway or airline service to rural areas to stimulate other economic and social benefits for the people of

that region and those who wish to contact them. For example, if the state provide the impetus and economic demand for a local telephone company to run fiber to a state facility, like a community college, prison or hospital, as part of the public switched network, rather than a private network component, businesses in that area could then utilize the capabilities of the fiber optics, upgraded switches and software, rather than not having it available to them for a period of years.

The Federal Government and FTS 2000

FTS 2000 is the largest private telecommunications network in the world and it also represents the largest government contract ever let for civilian purposes. The two firms that won the contract, AT&T with 60% of the business and US Sprint with 40%, can earn up to $25 billion in revenue over the 10 year contract. When completed, the network will serve 1.3 million federal employees in all 50 states (plus Guam, Puerto Rico, and the Virgin Islands), using over 300,000 miles of fiber optics. The network has been called potentially, "the most technologically advanced system in the world" (Los Angeles Times 9/6/89).

The contracting process itself for FTS 2000 was very controversial. The original idea was that one bidder would win the entire contract, to achieve large economies of scale and lower prices. Congress, particularly through Democrat Jack Brooks from Texas, intervened to encourage a procurement split so that more than one firm would benefit from winning the bid. In addition,

in the bidding process, there were several accusations of information being passed on to some bidders in illegal fashion. Thus, the procurement process itself was fraught with controversy.

FTS 2000 is replacing an older government network installed in 1963 by AT&T, when there was no competitive bidding. That network could only provide basic direct dial service and some low speed data transfer. FTS 2000 can provide many advanced services. It can provide conference calling for up to 48 different locations at one time, video conferencing, electronic mail, high speed fax, protocol converson, and packet switching. The contract operates by allowing AT&T and Sprint to sell services to the particular agencies to which they are assigned exclusive rights; the more services they sell, the more revenue they can generate. To promote such services, AT&T publishes a monthly newsletter on FTS 2000 capabilities. FTS 2000 first went into effect on October 12, 1989, serving some 29 different agencies.

In addition to new services that can increase productivity and improve employee monitoring, FTS 2000 can save agencies money. With more rounds of federal budget cuts ahead, such savings are important. Already about $178 million is estimated to have been saved by FTS 2000 implementation, with a likely level of $200 million per year in savings when fully operational.

In addition to the criticism of the procurement process, more recent criticism questions whether the savings from FTS 2000 are substantial. To be sure, FTS 2000 is saving money relative to the 1963 federal network. As volume discounts for large

private users have expanded, however, GAO has charged recently that the federal government could have gotten as cheap or even better rates without contracting for this new network. GAO claims that FTS 2000 is costing at least $148 million more during the 1991 and 1992 fiscal years than if the federal government simply purchased long distance services on the commercial market. More specific criticism focuses on the fact that US Sprint, the more expensive provider, has so far gotten a larger share than the prescribed 40%. The accuracy of these charges has been questioned and Congress is in the process of holding hearings on these issues.

Related to the proliferation of different networks in many states discussed below, another criticism of FTS 2000 has developed in recent months, in the wake of the failure of AT&T service in New York that slowed communications generally and particularly airport communications services. The FTS 2000 contract as administered by the General Services Administration prevents agencies from going outside the system. Congress initially endorsed this policy. To provide improved reliability, the Federal Aviation Administration would like to establish its own separate network. After Congressional hearings this fall, the FAA has been allowed an exception to go outside the network for extra reliability.

State Government Networks

Researchers from Syracuse University studied state government information technology management, of which telecommunica-

tions was one part. As of 1989, they found that Florida, Washington, Maryland, Montana, Texas, Oregon and South Carolina had already developed extensive networks (Caudel et al 1989). Twelve other states, including California, New Jersey, New York, Arizona, Kentucky, Massachusetts, Minnesota, Utah, Colorado, Connecticut, Oklahoma and Delaware were in the process of building networks at that time, and Michigan, Vermont and Wyoming were studying the issue. "For the most part, the new networks take advantage of the existing infrastructure or are building the networks in stages." (Caudle et al, 1989: 61).

A few states have particularly advanced networks that connect government, universities, and commercial businesses. New York, with NYSERNET and Texas are perhaps the most prominent examples. Currently, Florida, North Carolina, Ohio, Michigan, Pennsylvania and Wisconsin are implementing similar networks. In addition, Kentucky and Iowa are planning such networks and Illinois has proposed one.

New York state government provides a useful case study, as it already utilizes at least 8 networks to serve different state agencies - CAPNET, EMPIRENET, CRIMNET, SOCIAL SERVNET, LOTTERYNET, SUNYNET, SUNYSAT, as well as NYSERNET. New York is not at the extreme as Oregon had 20 separate government agency networks planned and South Carolina had 13 separate intercity data networks (Caudle et al 1989). Caudle et al (1989: 61) note: "There still remains a multitude of disparate voice, video, and data networks controlled by state agencies."

Like many other governments, New York has developed state private networks to link state agencies, to cut costs, and to improve reliability. For example, Jack Heinsohn, state director of telecommunications, says that New York Telephone has no backup plan for its central office serving the Albany area: "If that office goes down, an area of probably 35 to 40 miles around the state capital is out of service. That is not acceptable." (Richter 1991C; 46). The state spends over $160 million per year on telecommunications equipment and services, about 1/2 of which is spent by the Office of General Services rather than by individual agencies (Schmandt et al 1989). EMPIRENET and CAPNET are telecommunications networks used by most state agencies, except Criminal Justice (CRIMNET) and Social Services, which have their own systems. In addition, for research and higher educational purposes, the state operates SUNYNET, SUNYSAT, and NYSERNET.

CAPNET, a state owned and managed network, links 65 buildings within an 8-10 mile radius of Albany, with 600 miles of fiber optic lines in conduit (5 of these buildings are connected using digital radio). CAPNET, which started operations in June 1987, provides telecommunications service with a PBX to 35,000 lines, which is cheaper than the Centrex service previously used. CAPNET also provides packet switching to 6,000 users, the largest such system in the country (at least until FTS is fully implemented).

EMPIRENET, started in 1988, goes beyond the capital area of Albany to link agencies around the state together, using leased

services from Eastern Microwave for interLATA service, NY Tel for local connections, and IBM for management software. None of this sytem will be owned by the state. The projected cost savings from EMPIRENET are $ 150 million over 5 years, as one state network is more efficient than having each agency develop their own. For now, EMPIRENET operates at lower speeds than CAPNET but it is upgrading rapidly to become a statewide digital, T1 backboned, data network. Agency users pay for EMPIRENET service based on bandwidth utilized rather than by per mile charges. EMPIRENET ultimately will connect over 12,000 lines previously linked by separate networks.

The New York state Lottery has maintained its own leased network to link the 7,000 lottery agents around the state. They are now in the process of switching to the EMPIRENET system, as their cost per circuit is expected to drop from about $ 280 to $ 136 on EMPIRENET. The Department of Social Services is also reviewing whether to join EMPIRENET or continue with their own system.

CRIMNET, which became operational in 1989, links together state criminal justice agencies, including state police, courts and administration, criminal correction, and probation, and will add motor vehicles soon. These agencies formed a task force and decided not to join the state EMPIRENET system, for reasons of confidentiality and maintaining network control. The CRIMNET system includes a 56 kb backbone, with over 300 circuits over 12 T1 nodes in all major cities of the state. The T1 lines are

leased from a variety of providers, including AT&T, Sprint, and Eastern Microwave, and the local circuits are provided by local telephone companies like NY Tel and Rochester. The large bandwidth provides cost-savings and improved reliability over previous arrangements. CRIMNET is funded out of the agencies' telecommunications budgets. They are experimenting with innovative ideas like video conferencing by the Division of Youth and sending fingerprints by facsimile.

The state also has several networks devoted to educational and research services. SUNYNET links the 32 SUNY colleges and universities around the state. It started over 15 years ago as a network that connected data terminals at the campuses to the central SUNY administration in Albany. In 1989 a T1 backbone ring was installed to provide 56 kb data service. Rochester's RCI is the interLATA vendor. Usage of the SUNYNET system has evolved from a traditional STAR configuration from central administration to a peer-to-peer mesh among the 32 campuses. The community colleges will soon be linked up to SUNYNET. SUNYNET is funded partly from central administration and partly by each of the campuses.

There is also a satellite network called SUNYSAT, which is operated by the New York network NYSERNET. SUNYSAT provides uplinks and downlinks to campuses. NYSERNET itself has a somewhat broader role, as a high-speed data network that links together universities, supercomputers, research facilities and labs, medical centers, and libraries in New York, to promote

research and educational exchange. NYSERNET is funded by state government, the National Science Foundation, and the network providers, New York Telephone and Rochester Telephone.

Recently, representatives of all of these New York State networks have discussed cooperative opportunities for mutual advancement to the next level of technology. They are also considering how to better leverage these networks into economic development for the state.

Several other states have developed major private network systems. Indiana's Intelenet is a state commission created exclusively to provide economical, high quality telecommunications services for government, including local governments in the state, and education. Intelent has built a statewide fiber network that can provide voice, data, and video. Intelenet also aggregates government user demand to achieve volume discounts for long distance services.

Minnesota has implemented a statewide network known as STARS, or State Telecommunications Access and Routing System. The state government was an early advocate of developing a strong telecommunications infrastructure. STARS includes digital telephone lines, two-way video service and computer links that interconnect state agencies, schools, libraries, city and county governments and colleges and universitities. STARS is supported by the state Department of Administration and the Higher Education Advisory Council. Richter (1990: 21A) notes that the assistant commissioner of administration "described the state's

role in telecommunications development as equivalent to "the prime tenant in a new office building. When the public sector moves in, the private companies are attracted, too." So even though they are using a private network, they are trying to use it to upgrade the public switched network.

In some other states, particularly rural ones, state governments have self-consciously used (or plan to use) the extension of state government services, in education and other areas, to promote network and facility upgrading that can benefit other users and stimulate private sector development in that area. Essentially, some states use their own network needs to stimulate a telecommunications "industrial policy". Such a strategy may have significant external benefits for the private economies of rural regions if these upgraded network pieces are provided as part of the public switched network that other users, including private businesses, can access. As Fulton (1989: 42) notes: "In the meantime [waiting for ISDN], states have a quicker, more effective tool for exploiting the economic development potential of fiber optics: themselves. Aside from home entertainment, the largest future markets for telecommunications technology in rural areas are government."

Maine has offered free access to its own rights-of-way as an incentive for carriers to extend fiber networks further across the state. The seven campuses of the University of Maine are linked by an interactive audio and video network. Courses will be transmitted to 200 other schools in the state. The OTA (1991:

30) noted: "the University of Maine/Telecommunications Systems used a 5-year, $4.4 million grant from the Department of Education under Title III of the Higher Education Act, matched by the State government, to help telephone provicers pay for the upfront costs of deploying a fiber network linking State universities and community colleges." State Planning Director Richard Silkman makes telecommunications in Maine a high priority issues and he notes: "If you run fiber optics out there [to rural areas], you have a guaranteed market - the university. What we're hoping to be able to do is stimulate demand on the business side of those facilities." (Fulton 1989: 42).

In Wyoming and Georgia, as well as Maine, state government officials note that they could extend their own networks to remote parts of the state, but the private sector spill-overs are more positive if they contract with the local exchange carrier to do so. Richter (1990: 17A) found that: "Georgia's decision to implement a state-of-the-art digital network stemmed partly from officials' desire to benefit the state as a whole, both public and private sectors." And Wyoming's Telecommunications Administrator argued: "Quite frankly, we could build our own network here to get to the far reaches of the state, but we recognized that we as the lead customer in the state should try to push the telecommunications industry as far as possible, with us as the prime user." (Richter 1990: 18A).

In addition, Iowa has recently approved a 3,500 mile fiber optic Communications Network (ICN), "to extend the geographic

reach of state educational services, and at the same time . . reduce transmission costs for the government's voice and data traffic," by $5.1 million per year (Richter 1991: 65). In this case, providers of the public switched network did not offer appropriate services and Kiewit Network Technologies won the bid. Richter notes: "Glen Anderson, administrator of the DGS Communications Division, says the telephone companies "deliberately boycotted" the competition and then accused the the state of "stealing traffic they say they need to hold the ratepayers on the public network."

A recent study in Nebraska (Nazim 1990), points to the advantages of a proposed "hub" aggregation strategy to enhance information-oriented development in rural areas, which state government as a user could encourage if not pursue directly. In a more urban setting, Nebraska has pushed to make Omaha the "1-800" and telemarketing center for the country, updating its previous role as a railroad center. This strategy has been successful. By 1989, there were 26 telemarketing or reservation service firms in the greater Omaha area, including Greyhound, Union Pacific railroad, 3 separate American Express units, and Marriot, Hyatt, Radisson, Westin, and Omni hotels, employing a total of 10,000 people (Russell and Russell 1990). To stimulate this policy, Nebraska has used its own state government procurement as a lever. Richter (1990: 17A) notes: "If carriers resist modernizing their central office facilities in smaller communities, William Miller, director of Nebraska's Division of Communi-

cations, reminds them that the state can always purchase its own advanced switching facilities."

New Mexico was one of the first governments to see the economic development advantages of linking major users. It has utilized "Technet" since 1985 to connect government agencies, universities, and (especially federal) research laboratories. The Technet system is a private non-profit network funded through user fees. Technet is open to anyone who wants to join and it is priced relatively inexpensively for small users. Over the network, users can access state business and commerce information, motor vehicle information, government procurement requirements, and general university data bases.

The Illinois Statewide Telecommunications Network was established in 1988 under a contract with Illinois Bell and US Sprint for $108 million over seven years. It includes a digital fiber optic backbone to connect 2,824 user locations with voice, data and video services. The network already provides video conferencing between Chicago and Springfield. State officials are discussing how it could provide improved access to public services and data bases.

Local Government Networks

Local governments in the U.S. vary from the very large, as in New York City, to the very small villages and towns spread across the country. Obviously, the telecommunications needs and capabilities of these governments will vary greatly. Here, I

will briefly present two extremes case that have been active with private telecommunications networks, New York City and Bloomsburg, Pennsylvania. Generally local governments are more concentrated than states, and therefore their network choices are often easier, as they are more likely to involve mainly local services as opposed to state users involved in local and long distance services.

New York City is larger in population than most states and is much more concentrated and dense. Private communications networks in New York City include many of the most advanced in the world, particularly for Wall Street financial firms. Recently, the city government has been able to add to its own private data and voice networks by striking a deal with a competitive provider, Metropolitan Fiber Systems (MFS), that wanted to enter the market for private communications access. In 1990, the City government and MFS completed a franchise agreement for MFS to install and operate a voice/data fiber optic system. In return for the right to operate in the city, MFS will pay a franchise fee to and will provide in-kind services for city government. The city government will get exclusive use of 22 strands of "dark fiber" in the initial backbone of the MFS system, 15% of any additional fiber count added to the system and, at the election of the city, the installation of drop cables into designated buildings, owned or leased by the city and containing city offices, and/or the establishment of a telecommunications fund. MFS will provide its services to the city at 25% below the lowest

price they charge anyone else for a similar service with similar volume. Thus, by using its power over franchising and rights-of-way, city government in New York was able to expand its own private network substantially, at very low cost.

Bloomsburg, Pennsylvania is a rural town of about 10,000 people toward the other extreme of the telecommunications spectrum from New York City. Bloomsburg does share with New York a desire to encourage telecommunications-intensive business to locate and remain in their community. Thus, the town prepared a telecommunications analysis that determined that lack of access to a interexchange carrier point-of-presence was limiting their telecommunications options. They are currently considering bypassing the public switched network, with a microwave link to a point of presence in Harrisburg, in conjunction with the state university branch campus in their town. Thus, even small governments are considering various forms of private networks and network bypass for reasons of service improvement or cost reduction.

Delivery of Service to Clients

While many government networks were originally established mainly for internal communications purposes, the goals have been expanded in many cases to provide new and better service to government clients. This includes providing direct services and also providing access to large amounts of state data. Some of the most critical government services increasingly dependent upon telecommunications include public safety, transfer payments,

unemployment compensation and payment of government's own bills. In addition, there are other important public services that telecommunications are playing an increasingly important role in providing. This section of the paper highlights some innovative government delivery of education, social and emergency services.

According to Nelson Heller: "Telecommunications technology has yet to receive the press coverage given to personal computers in the classroom, but its impact on education will be equally far-reaching." (Heller 1990: 94ED). This impact may be greatest in rural America, where shortages of teachers and other resources are most acute. At all levels, education is one of the most labor-intensive services in our economy; at 93% of total costs, labor costs are twice those in the average business. Conversely, capital investment in schools, at about $100 per worker, is minuscule compared to the $ 50,000 average per employee in American businesses (Perelman 1990: 16ED). Thus, there is plenty of room for the application of new technologies to the educational enterprise.

As a recent survey (Richter, 1990: 17A) of state government telecommunications activity noted: "Virtually every state provides some form of one- or two-way audio-video distance learning between central and outlying college campuses." Thus higher education is already utilizing telecommunications in rural and outlying areas. The OTA (1991: 25) notes: "educational institutions . . . as large users of communications services - often ranking second only to State government - they exert considerable

market power." Importantly, many of these educational applications do not rely on the public switched network but on their own specialized facilities (Tennessee 1990). There are exceptions. For example, New England Telephone is building Maine's educational network.

While education at all levels appears to be the area where government could maximize its leverage into telecommunications-based economic development, there may be other joint venture or partnering applications with governmental institutions. Several states have pilot programs to deliver social services using telecommunications, such as providing welfare checks via automated teller machines, an experiment underway in New York, Arizona, Maryland, Washington, Pennsylvania, and Minnesota (Richter 1990: 16A). Other services, including criminal justice activities, might be provided more efficiently through telecommunications. For example, Oregon is trying some minor criminal cases using televideo, to save on transport and housing of prisoners. Another possibility is "televisits" to prisoners in rural areas by their urban families and friends who must pay in time and money for transportation visits. Government emergency services, especially enhanced 911 services that provide nearly instantaneous data base access to addresses of incoming calls, are increasingly being tried by governments. California and Arizona are beginning serious experiments with decentralizing state workers and telecommuting (Niles 1989), in part to reduce automobile pollution and congestion. The four state agencies participating in Arizona

have experience substantial successes and the "positive results just keep compounding" (Richter 1991b: 67).

Trends

Unless state pricing policies that keep access charges well above costs are changed, more governments are likely to pursue the option of private telecommunications networks. Such networks are already well established at the national government level, by all state governments, by most large cities, and increasingly by smaller and more moderate sized communities. Once these networks are in-place, especially if they utilize owned rather than leased facilities, governments are not likely to abandon them in the wake of rate structure changes. Thus, I expect to see the public going private more often and probably staying that way, unless their technology becomes quickly outdated.

The exceptions are and will be when governments believe that their own choices to implement purely private networks would harm the public switched network in their jurisdiction, and thus their own competitive position as a location for business growth and expansion. Some states have already recognized this issue and are developing policy accordingly.

Another important and interesting trend will be interconnection policy of government networks into other networks, especially as the service delivery functions become more automated. Motor vehicle licensing and registation, building department records, voting registration, and a range of other governmental

functions could easily be more productively advanced through telecommunications. Such linkages to the outside world may influence the types of network choices government make. Increased interconnection will greatly enhance the importance of privacy concerns. Whoe should have access to which government data and in what form? Relatedly, what is the best funding mechanism for access to such data and services? Higher user prices will discourage small users, which harms the basic premise, but low user prices may not cover costs and will send uncertain signals about public acceptance of the technology.

Conclusions

As with private businesses, while costs are not the only reason to establish private networks, cost savings seem to be the most important impetus for the public to go private. An increasingly important trend is for governments to move from using these networks mostly for internal communication and productivity enhancement to using them for external client services.

Some of these government networks are very large enterprises, that have been made even larger by the aggregation of government demand as with FTS 2000 and Indiana's Intelenet. One large network is probably better for governments than a substantial number of potentially hard-to-connect agency networks. Redundancy can still be achieved (at a price) from the public switched network.

Overall, governments would probably do well to take a somewhat broader perspective than private businesses do. They could

emphasize not just costs but economic development, infrastructure and technological "push" in their procurement decisions. They could also work more closely with regulatory bodies, mainly the FCC and state PUCs in developing coherent government approaches to this industry. For example, in New York state (Schmandt et al 1989: 32): "Neither the Office of General Procurement or the DED [Department of Economic Development] links state procurement policy with economic development." It is understandably difficult for government procurement officials not to take full advantage of any available short-run cost savings, particularly in these times of severe state budget shortfalls all over the nation. Still, farsighted leadership and coordination on this issue could pay large dividends.

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