PRIVATE NETWORKS PUBLIC OBJECTIVES
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When the Public Goes Private

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1. INTRODUCTION - GOVERNMENT AS USER

The federal government is by far the largest single employer in the United States. In addition, more than one in seven working Americans are employed by state or local governments. Government workers make up a very large percentage of employment in the American economy, and in other nations. Not surprisingly, then, a very large share of telecommunications usage is generated by government at all levels. A broader conception of the public sector, including public universities, public health care facilities, libraries, and other related public and not-for-profit enterprises, makes public sector choices even more important to telecommunications providers. Government choices about usage privatization, especially in establishing private networks, are important simply in terms of the scale of the government enterprise. As Kettl[1] noted about FTS 2000: "The very size of the government's contract made it unlike any other player in the market."

Such choices are also important if we ask whether or not governments should act *differently* than private enterprises in establishing private networks. If broader government policy aims to encourage innovation in technology and the expansion of network facilities to all citizens, then governments may develop their own networks differently than would profit-making enterprises. In this paper I consider the choices governments have made, the factors that have contributed to those choices, and the effects of those decisions.

American federal and state governments are relatively sophisticated users of information technology. For example, recent data show that the federal government has the highest ratio of computers to deskworkers, even compare to business access to computers, while state governments are equal to business and local governments trail behind business.[2] As service operations that specialize in information rather than the production of physical goods, governments must use information technology to their advantage.

Several governments have established private networks to consolidate traffic on one network to achieve cost savings by avoiding access charges. Sometimes governments actually own all or part of a network, including switches and lines, but most often they lease facilities or services from telephone providers.

The degree of ownership varies greatly. The federal government now buys services in long-term contracts with AT&T and US Sprint in its FTS 2000 network. Many state governments have similar contracts; in 1989, according to Caudle and Marchand[3], state governments leased their complete systems in Florida, Texas, Connecticut, Maryland, Montana, and New Hampshire. Oklahoma and South Carolina own their government networks. Many states utilize mixed networks; for example, Washington state owns its network switches but not the lines, and Colorado owns only the Denver portion of its

network. Caudle and Marchand[4] 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."

2. WHY THE PUBLIC GOES PRIVATE

There are several justifications for establishing separate government networks of some type. Cost advantages are probably most important, especially in an era of government deficits. As with other private networks, government users may be able to avoid subsidizing other users by negotiating volume prices that are closer to the costs of service provision. Many government officials view the pursuit of cost savings as their duty. However, these decisions ignore the possibility that citizens, who are also residential ratepayers, may lose money over the longer run, if the state private network does not provide "economic" bypass. Given the size of some large government networks, their bypass may be economic. However, some critics[5] have argued that FTS 2000, the largest government network, actually may not be saving money relative to the volume discount rates now routinely given to large users.

Second, some governments establish their own networks to enhance security and privacy for sensitive operations. This is most obviously justifiable for national intelligence gathering organizations like the CIA and the FBI, and may also be important for state criminal justice organizations, such as New York CRIMNET, and perhaps, too, for social service or health providers.

Third, some governments have developed a single large network because they realized that several of their agencies were already developing separate networks. For example, Oregon had twenty separate government agency networks. Caudle and Marchand[6] note: "There still remains a multitude of disparate voice, video, and data networks controlled by state agencies." If each agency made different choices about providers, services, and standards, interconnection might become difficult, and some governments hope that a large unified network will allow them to coordinate and control all telecommunications operations.

Fourth, private government networks may provide special features, or "functionality", that can not easily be provided without private networks. Redundancy is one such feature. Often private networks retain an "option demand" to use shared network facilities 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 has done with its TIM system.[7]

Fifth, governments may develop private networks to provide a strategic advantage, by delivering services to their clients more effectively. Internet is an example of a subsidized network aimed at improving the flow of research and development communications. Networks that are built explicitly with client service in mind may achieve more cost savings, productivity and service quality than can purchasing services from an existing network. This includes providing direct services, such as motor vehicle registration, as well as providing access to state databases. Education is the most important example; at 93% of total costs, education is the most labor-intensive services in our economy.[8] The OTA[9] notes: "educational institutions . . . as large users of communications services -- often ranking second only to State government -- exert considerable market power." Sometimes education networks utilize separate facilities, in other cases, as in Maine, they are constructed as part of public networks.

Many of these reasons for private government networks parallel those for private corporations. Opposing these arguments is the "taxpayers are also ratepayers" perspective that shortrun savings to government from private networks may lead to long run cost increases for telephone ratepayers. Whether or not this is accurate, such an argument does *not* have political salience, as cost savings are immediate and traceable to individual political actions, while rate increases are longer term and less traceable. A more important argument against "the public going private" is that the external benefits of extending a larger network that other users can utilize may be substantial, particularly in rural areas that might otherwise not be modernized quickly. This is an infrastructure justification with parallels to public transportation choices to provide government 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.

Next I examine some significant federal, state, and local government choices about private networks in more detail.

3. THE FEDERAL GOVERNMENT AND FTS 2000

FTS 2000 is the largest private telecommunications network in the world and the largest non-defense government contract. 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 ten years. When completed, the network will serve 1.3 million federal employees all over the U.S., using over 300,000 miles of fiber optics. American defense agencies across the world are served by a separate network operated by the Defense Communications Agency, which spends more than $ 3 billion annually.[10]

Prior to FTS 2000, the U.S. General Services Administration managed telecommunications by purchasing equipment and leasing lines at a time when there was no real telecommunications competition. Since 1963, for long distance services the government used AT&T's Tel-Pak services. That network, although larger than the 17 largest private business telephone systems combined,[11] only provided basic direct dial service and low speed data transfer. Over time, many agencies left the GSA system and paid more for better services with other providers. FTS 2000 was intended to reduce this risk of technological obsolescence.

Kettl[12] argues that the GSA had three options: (1) to incrementally improve the old system, (2) to design and purchase a new system, or (3) to develop a competitive bidding process. Even with the decision to contract, however, the contracting process itself became very controversial, with an original plan to have one winning bidder that could achieve economies of scale. Congress, particularly Texas Democratic Representative Jack Brooks, encouraged a procurement split to benefit more than one firm. The bidding process itself featured several accusations of illegal information passage to bidders.

FTS 2000 began service in October 1989, serving twenty-nine agencies. It can provide many advanced services, including conference calling for up to forty-eight different locations at once, video conferencing, electronic mail, high speed fax, protocol conversion, and packet switching. The contract allows AT&T and Sprint to sell services to their assigned agencies; the more services they sell, the more revenue they can generate.

In addition to new services that can increase productivity and improve employee monitoring, FTS 2000 can save agencies money. Compared to the old system, FTS 2000 has already saved an estimated $500 million.

In addition to the procurement problems, recent concerns focus on whether FTS 2000 is really saving money. While the comparable historic cost savings noted above are accurate, as volume discounts for large private users have expanded, however, the General Accounting Office[13] has argued that the federal government could have saved about $ 150 million more *without* using FTS 2000. Criticism also focused on the fact that US Sprint, the more expensive provider, has received more than its prescribed 40% share. All of these concerns have attracted Congressional attention and hearings.

The Congressionally-endorsed concept of requiring all agencies to use FTS 2000 became controversial after a 1991 failure of AT&T service in New York that slowed critical airport communications. To provide improved reliability, the Federal Aviation Administration wanted to establish its own separate network. After Congressional hearings in 1991, the FAA was allowed an exception to go outside the network for extra reliability.

Current and future issues for FTS 2000 include whether it will be exclusively an internal government network, or whether it will be used to provide electronic services to the citizenry, whether the next contract will operate similarly, or with more competitors, and whether most agencies should be required to use FTS 2000.

3.1. The Federal Government and the Internet

The Internet connects computer users and has become *the* shining example of a successful public private network. Originally developed by the Defense Department's Advanced Research Projects Administration as ARPANET, for military use and to test packet switching technology, the backbones of the Internet were extended by NSF (through NSFnet, started in 1986) and other federal agencies to universities and research facilities. It has grown into "the network of networks," as many users begin to realize its vast potential. As of the end of 1992, the Internet included 6,000 member *networks* and over 5 million *users* in over 100 nations.

Internet is subsidized by the federal government, either directly through the NSFnet backbone, or through grants to users. Through 1992, the network backbone was supported by $ 29 million from NSF, $ 13 million from the state of Michigan, and $ 60 million from IBM and MCI. Large subscribers connect on a flat fee basis so that for most actual users there is no usage charge, a fact which has contributed to its rapid growth. Apart from basic interconnection rules established by consensus by the Internet Society, the Internet Architecture Board, and the Internet Engineering Task Force, the Internet runs itself.[14]

The Internet is increasingly used as an example of what a "national information superhighway" could be, or is sometimes discussed as already being that facility. President Clinton has proposed developing the Internet into NREN, the National Research and Education Network.[15] After years of quiet growth in one segment of the economy, the Internet now receives substantial publicity and attention.

4. STATE GOVERNMENT NETWORKS

The fifty state governments are major players in telecommunications. In 1989, researchers from Syracuse University found that several states had already developed extensive networks and many more were following. They note: "For the most part, the new networks take advantage of the existing infrastructure or are building the networks in stages."[16]

A few states, including New York, Texas, Florida, North Carolina, Ohio, Michigan, Pennsylvania, Indiana, and Wisconsin, have advanced networks that connect government, universities, and commercial businesses. New York provides a useful case study, as its governmental agencies have utilized more than 8 networks -- including CAPNET, EMPIRENET, LINCS, CRIMNET, LOTTERYNET, SUNYNET, SUNYSAT, and NYSERNET.

New York has developed state private networks to cut costs and to improve reliability. The state spends over $200 million annually on telecommunications services.[17] EMPIRENET and CAPNET are used by most state agencies, except Criminal Justice (CRIMNET) and the universities, which have their own systems.

CAPNET, a state owned and managed network started in 1987, links sixty-five buildings within an eight to ten mile radius of Albany, with 600 miles of fiber optic lines and a 35,000 line PBX. CAPNET provides the largest nation's packet switching system, except for FTS 2000, to 6,000 users. Blunt[18] notes: "unlike CAPNET, EMPIRENET is a service contract, i.e., the state owns no assets." EMPIRENET, started in 1988, connects 12,000 lines in agency offices across the state.[19] EMPIRENET will save $ 150 million over five years, compared to the previous networks. Agency users pay for bandwidth utilized rather than per mile charges. The state Lottery had maintained its own leased network to link 7,000 statewide agents, but switched to EMPIRENET to save money.

CRIMNET, started in 1989, links state criminal justice agencies, including the state police, the courts, criminal corrections, probation, and motor vehicles, and is funded by their respective budgets. To maintain network control and better confidentiality, these agencies chose not to join EMPIRENET.[20] The large bandwidth saves money and allows experiments with video conferencing and facsimile-sent fingerprints.

The state's educational and research networks include SUNYNET, NYSERNET and SUNYSAT. SUNYNET, started nearly 20 years ago to link data terminals to central SUNY administration, now links the thirty-two SUNY colleges and universities.[21] SUNYNET is funded partly by the central administration and partly by each campus. SUNYSAT provides satellite up and downlinks to each campus, and is operated by NYSERNET. As a high-speed data network, NYSERNET has a broader role: to link together universities, supercomputers, research facilities and labs, medical centers, and libraries in New York, to promote research and educational exchange. NYSERNET is funded by the state government, the National Science Foundation, and the network providers, New York Telephone and Rochester Telephone.

In 1992, representatives of all of New York State networks developed cooperative opportunities for mutual advancement to the next level of technology.[22] They considered how better to leverage these networks into economic development for the state. They proposed to: "Utilize the state's considerable public and private educational community to converge their existing data, video, and voice networks into an expanded, integrated 'open digital highway.' Merge this new 'Educational' network with state government's EMPIRENET."[23]

Several other states have developed major private network systems. Indiana's Intelenet provides data, video, and voice services for government agencies, including local governments and education, and aggregates government user demand to achieve volume discounts for long distance services. Minnesota's STARS (State Telecommunications Access and Routing System) network, links statewide public users and is supported by the Department of Administration and the Higher Education Advisory Council. Richter[24] 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."

In other, particularly rural, states, governments self-consciously use the extension of their services, including education, to promote network and facility upgrading that can benefit other users and stimulate private sector development in that region. Essentially, some states use their own network needs to stimulate a telecommunications "industrial policy." Such a strategy may have significant external benefits for their private economies if these upgraded network pieces are accessible to private sector users. Fulton[25] 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 governments."

Maine has offered free access to state rights-of-way to provide carriers with incentives to extend networks. Seven campuses of the state university are linked by an interactive video network that transmits courses to 200 schools. State Planning Director Richard Silkman 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."[26]

Wyoming and Georgia government officials note that they could extend their own networks to remote parts of the state, but the private sector spillovers are more positive if they contract with the local exchange carrier. Richter[27] 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."[28] To pursue its telecommunications industrial policy, Nebraska uses state government procurement as a lever.

5. LOCAL GOVERNMENT NETWORKS

Local governments in the U.S. vary in size, from the very populous, like New York City, to the tens of thousands of smaller villages and towns across the country. Obviously, their telecommunications needs and capabilities vary widely. Here, I briefly present two extreme cases of private telecommunications networks -- New York City and Bloomsburg, Pennsylvania.

New York City is larger in population than all but a few states and is much more dense. Private communications networks in New York City, particularly for Wall Street firms, are the most advanced in the world. The city government has added to its own extensive private data and voice networks by striking a deal with a competitive provider, Metropolitan Fiber Systems (MFS), a firm that wanted to enter the market for private communications access. In 1990, City government and MFS completed a franchise agreement for MFS to install and operate a voice/data fiber optic system. In return for this right, MFS pays a franchise fee to and provides city government exclusive use of a share of the fiber optics put into their network at a cost 25% below their lowest volume discount. Thus, through its franchising and rights-of-way power, New York City expanded its own private network substantially, and at a very low cost.[29]

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

6. TRENDS IN AMERICAN GOVERNMENT NETWORKS

Until telecommunications carriers are given more pricing flexibility, and perhaps beyond then as well, more governments may 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 installed, especially if they utilize owned rather than leased facilities, governments are not likely to abandon them easily. Thus, the public may go private more often and may stay private, unless their technology becomes outdated quickly.

The exceptions occur when governments believe that their choices to implement purely private networks harm their public network providers, 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. Other governments believe that technology will change so fast that leasing facilities or "virtual networks" is the more appropriate and flexible response.

Perhaps a more important trend will be the interconnection policies of government networks with other networks, especially as telecommunications service delivery functions advance. Networks could easily and more productively provide motor vehicle licensing and registration, building department records, voter registration, and a range of other governmental functions. Such linkages to their "clients" may become the most important influences over government network choices. Increased interconnection will greatly enhance the importance of privacy concerns. Who should have access to which government data and in what form?[30] A related question becomes, what is the best funding mechanism for access to such data and services?[31] 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.

7. CONCLUSIONS

As with private businesses, cost savings are one of the most important reasons for the public to go private. Functionality, confidentiality, reliability, and control issues are also influential. An increasingly important trend is governments' moving from use of their networks only for internal communication toward use for external client services.

While it is too early to make final judgments about government networks, initial successes have largely come from cost savings over previous arrangements. For example, despite controversy, Kettl[32] argues: "FTS 2000 was a huge success in many important

respects." Missed opportunities from some of these networks are less obvious; many governments have not attempted to develop a better telecommunications infrastructure for economic development. But the evidence is not yet in for those that have. As gateways to providing better government-citizen interactions, the experiments are only just beginning.

The Internet has "snuck up" on many analysts to become the most interesting and important governmentally-supported network. As it grows beyond its initial role for universities and the research community, it becomes less of a private network, and more of a publicly-accessible network of networks with amazing potential.

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ENDNOTES

[1] Kettl, Donald. 1993. *Sharing Power: Public Governance and Private Markets*. Washington, D.C.: Brookings Institution.

[2] 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; non-durable 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.

[3] Caudle, Sharon and Donald Marchand. *Managing Information Resources: New Directions in State Government*. Syracuse University, 1989.

[4] Page 61, Ibid.

[5] General Accounting Office of the United States. *FTS 2000: GSA Must Resolve Critical Pricing Issues*. IMTEC-91-79 September, 1991.

[6] Page 61, Caudle, Sharon and Donald Marchand. *Managing Information Resources: New Directions in State Government*. Syracuse University, 1989.

[7] Pages 49-50, Richter, M.J., "Staying Connected: Disaster Recovery for Government Telecommunications." *Governing*, September, 1991.

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[12] Page 72, Ibid.

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[18] Page 111, Blunt, Charles, Sharon Dawes, and John Philippo. *Transitioning New York In the Information Age: Telecommunications - A Vital Infrastructure for the New York*. Report prepared for the New York State Forum for Information Resource Management, 1993.

[19] EMPIRENET uses leased services from Eastern Microwave for interLATA service, NY Tel for local connections, and IBM for management software.

[20] CRIMNET 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.

[21] In 1989 a T1 backbone ring was installed to provide 56 kb data service.

[22] Blunt, Charles, Sharon Dawes, and John Philippo. *Transitioning New York In the Information Age: Telecommunications - A Vital Infrastructure for the New York*. Report prepared for the New York State Forum for Information Resource Management, 1993.

[23] Page iii, Ibid.

[24] Page 21A, Richter, M.J. "Telecommunications: A Telecompetitive World." *Governing*, September, 1990.

[25] Page 42, Fulton, William. "Getting the Wire to the Sticks." *Governing*, August, 1989.

[26] Page 42, Ibid.

[27] Page 17A, Richter, M.J. "Telecommunications: A Telecompetitive World." *Governing*, September, 1990

[28] Page 18A, Ibid.

[29] Teske, Paul and John Gebosky. "Local Telecommunications Competitors: Strategy and Policy." *Telecommunications Policy* October, 1991.

[30] Katz, James and Richard Graveman. "Privacy Issues of a National Research and Education Network." *Telematics and Informatics* 8: 71, 1991.

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