

**HB**

**397**



## Representative H.A. "Red" Boucher

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Chairman House Committee on State Affairs • Special Committee on Telecommunications

### MEMORANDUM

TO: House State Affairs Committee Members

FROM: Representative H.A. "Red" Boucher

DATE: January 18, 1990

RE: HB 397 Department of Information Services

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We all recognize that information is the lifeblood of government. We also recognize that information is becoming more complicated to manage. To manage information, we have become dependent upon computers, software, networks, telephones and Fax machines, and satellites. So management of information through the setting of policy that makes sense has become the challenge of state government in the 1990's.

Generally speaking, the management of information in Alaska has been technologically driven; that is, the answer to improving the quality of and access to information has been simply to buy the latest technology (e.g. mainframe computer). Consequently we have stumbled into the trap of making the hardware the focus of management decisions rather than talking about planning and developing policy from which technical decisions are made. The result is that often what was purchased was inappropriate and not part of a long-range plan to meet our real needs.

In 1987, the legislature established the Telecommunications Information Council (TIC) a cabinet level-policy making body. As we look back on what has been accomplished through TIC, however, we find that we have not been able to move beyond that mind set of using technology to manage information and set policy. The TIC, for example, has been used to make hardware decisions rather than setting policy.

The problem that we have to come to grips with is the fact that while we gave TIC a blueprint to operate, we did not

give it the infrastructure and funding to get the job done.

During the interim, I have been meeting with various people throughout the country who have been playing leading roles in the development of information technology. We have seen the gains that have been made in the management of technology in different states such as Kentucky, Florida, California, Washington and Minnesota.

What has been very apparent in these states is their success in managing computer services and telecommunications - that success is related to the fact these states have brought information management and policy to the highest levels of government. States such as Kentucky, for example, have created a Department of Information Systems giving it cabinet level status. This department provides support to Kentucky's Information Systems Commission - a policy making body within the executive branch which is similar to Alaska's Telecommunication Council.

#### Purpose

HB 397 establishes a Department of Information Services. It takes the Division of Information Services out of the Department of Administration and gives it departmental status. HB 397 also creates a structure/organization modeled after Washington State, Florida and Kentucky, and recent changes in the Division of Information Services.

The establishment of the Telecommunications Information Council in 1987 was the first step. The establishment of a Department of Information Services at the beginning of the 1990's is the next logical step. This department will provide the state with the necessary infrastructure it needs to meet the challenges of the 1990's and beyond. At the same time the department will provide the Telecommunications Information Council the necessary support it needs to develop sensible information policy.

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Technical Consulting,  
Micro/Mini Support,  
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Customer Relations and  
Service, Procurement Data

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| Planning and Budget |  
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Customer Advisory Board (CAB):

- Provides the DIS with advice/recommendations concerning type, quality, and cost of department services
- Reviews and comments on the service goals and objectives of the DIS including budgets and rates charged for services
- Responsible for drafting the state's Strategic Plan for Information Resource Management

Information Resource Managers (IRMs)

Each state agency or department that DIS serves will be represented by a IRM who is responsible for developing information resource policies for his/her agency in conformance with policies, standards, and rules established by the DIS, and shall coordinate all agency information resources management activities of their agency.

Each IRM is responsible for the preparation of the agencies strategic plan for information resource management.

Each IRM will be a member of the Customer Advisory Board.

Dept./Agency Strategic Plan for Information Resource Management

Each department, U of A, LAA and Judiciary shall submit to the Customer Advisory Board a strategic plan for information resources management. This plan will support and further the policies and objectives of the DIS, and be in line with the TIC policy, guidelines and directions for information management and services.

The plan shall include:

1. A statement of the department/agencies programs, goals and objectives;
2. A description of the department/agencies major data bases and their applications;
3. A description of the department/agencies current information resources management organization, policies and practices;
4. A description of interdepartmental/agency computer networks;
5. A statement of the strategic objectives of the department/agencies relating to information resources management for the next 2 fiscal years;

6. The existing and proposed information resources management applications of the department/agency for the next 2 fiscal years; the anticipated results to be achieved; the measurable benefits to be derived including the measurement standards; the major resources required, and the department/agencies total estimated costs of each application, by program component.
7. A summary of the communication needs of the department/agency and the estimated cost of meeting those needs, by application, for the next 2 fiscal years.
8. Other planning components the DIS may prescribe.

State Strategic Plan for Information Resource Management

The Commissioner of the DIS, through the Customer Advisory Board, prepare for TIC's review and approval the State Strategic Plan for Information Resource Management.

In developing the Plan, the commissioner shall assess the current practices of state departments/agencies based on the department/agency strategic plans, regarding information resources management and current and future information resources management technologies and practices and their potential application in state government. The commissioner will consult with the Divisions of Telecommunications, Computer Services and Administration as to the direction of development of communications and communications services in the state.

Copies of the approved Plan shall be forwarded to TIC for approval. TIC shall forward to the Governor for approval. Copies then sent to the Senate/House Finance Committees and OMB.

The Plan shall:

1. Provide a strategic direction for information resources management by state government for the ensuing 2 fiscal years.
2. Establish state goals and objectives relating to information resource management.
3. Provide long-range policy guidelines for the state in achieving integrated and efficient information resource management.
4. Identify major statewide issues relating to improved information resources management by state government.

### Annual Performance Reports

Each year, each IRM shall prepare and submit to Customer Service Board an Annual Performance Report describing the agencies information resources management activities for the previous fiscal year.

That report will be reviewed by CAB, transmitted to the Commissioner, and then transmitted to TIC for approval.

The Annual Performance Reports shall contain:

- An assessment, by application, of the progress made toward implementing the department/agencies Strategic Plan for Information Resources Management.
- A summary, by application, of the major functional uses of and total estimated expenditures for information resources management by the department/agency.
- A comparison of the department/agencies actual expenditures for information resources management for the prior fiscal year and the appropriations for those resources contained in the agencies approved budget. Major differences between the expenditures and the approved budget shall be noted and justified.
- An inventory list, by major categories, of the agency's communications and information technology resources, and specifically identifying, by application, the resources acquired during the previous fiscal year. If such resources cannot be identified by application they shall be listed separately.
- An assessment of opportunities for agency participation in multi-agency information resources management activities.

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§ 44.19.447

STATE GOVERNMENT

§ 44.19.449

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**Sec. 44.19.447. Retaliation prohibited.** (a) An agency, officer, or state employee may not directly or indirectly refuse to hire, transfer or promote, or dismiss, demote, suspend, lay off, or otherwise discipline a person for filing a complaint with the office for a failure to comply with affirmative action or equal employment opportunity or for assisting the office in an investigation of a complaint.

(b) A person who knowingly violates this section is liable for a civil penalty of not more than \$1,000. (§ 2 ch 97 SLA 1985)

**Sec. 44.19.448. Access to confidential records.** The office may have access to all data, records, and reports necessary to carry out its functions under AS 44.19.441 — 44.19.449. The office may not make public information designated as confidential by AS 39.25.080 or another law. However, the office may make public statistical information compiled from confidential records. (§ 2 ch 97 SLA 1985)

- Sec. 44.19.449. Definitions.** In AS 44.19.441 — 44.19.449,
- (1) "agency" means a department, office, agency, public corporation, board, commission, authority, or other organizational unit of the executive branch;
  - (2) "employment in the executive branch of state government" includes employment as a permanent, probationary, provisional, non-permanent, or temporary employee in the classified, partially exempt, or exempt services in the executive branch of state government;
  - (3) "member of a protected class" means a person protected by federal or state laws that prohibit discrimination in employment or a person who experiences or has experienced difficulty in obtaining employment or advancement in employment because of another factor not related to merit;
  - (4) "office" means the office of equal employment opportunity in the Office of the Governor. (§ 2 ch 97 SLA 1985)

**Article 16. Telecommunications Information Council.**

<p><b>Section</b> 502. Telecommunications council 504. Powers and duties</p>	<p><b>Section</b> 506. Court system 519. Definitions</p>
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**Cross references.** — For statement of legislative purpose in connection with the enactment of this article, see § 1, ch. 53, SLA 1987, in the Temporary and Special Acts.

**Sec. 44.19.502. Telecommunications information council.**

(a) There is created within the Office of the Governor the Telecommunications Information Council.

(b) The council is composed of the governor, the commissioner from each principal department of the executive branch, the president of the University of Alaska, and the executive director of the Legislative Affairs Agency. The chief justice of the supreme court may appoint a member to serve on the council. Each commissioner shall appoint a deputy commissioner to serve as an alternate for the commissioner. The vice-president of the University of Alaska shall serve as alternate for the president.

(c) The governor shall preside over the council. The council shall meet at least four times each year. The council may meet more frequently at the call of the chair or if requested by a majority of the council's members.

(d) The Office of the Governor shall provide professional and clerical staff for the council. (§ 2 ch 53 SLA 1987)

**Sec. 44.19.504. Powers and duties.** (a) The council shall

(1) establish guidelines and prepare a state short-range and long-range information systems plan to meet state needs;

(2) in accordance with the state information systems plan, establish guidelines and direct state agencies to prepare agency information systems plans;

(3) in accordance with statutes governing the availability and confidentiality of information, establish guidelines for the accessing of information by the public;

(4) publish in the first quarter of each calendar year a report on the activities of the council.

(b) In addition to its duties under (a) of this section, the council may establish information-related policies and engage in information-related activities it considers necessary or appropriate.

(c) This section does not grant council responsibility for broadcast programming content. Program design, production, and use are the responsibility of the program-sponsoring agency or other entity.

(d) This section does not prohibit a state agency from developing information systems that are inconsistent with the guidelines established in (a) of this section if the council gives written authorization for the user agency to engage in the independent design, development, management, or operation. The council may authorize independent development only upon a showing of necessity. A description of authorization under this subsection shall be included in the annual report required under this section. Written authorization under this subsection is not required for intra-agency use of microcomputers.

(e) A state agency, including an agency authorized to develop an independent system under (d) of this section, shall coordinate the design, development, management, and operation of its information systems with the council. (§ 2 ch 53 SLA 1987)

**Sec. 44.19.506. Court system.** The administrative director of courts shall establish information systems guidelines and prepare a short-range and long-range information systems plan for the court system. The guidelines and plan must be consistent with the telecommunications information guidelines and plan adopted by the council under AS 44.19.502 — 44.19.519 and must be adapted to the special needs of the judicial branch as determined by the administrator of courts. (§ 2 ch 53 SLA 1987)

**Sec. 44.19.519. Definitions.** In AS 44.19.502 — 44.19.519

- (1) "council" means the Telecommunications Information Council;
- (2) "state agencies" means all departments, divisions, and offices in the executive and legislative branches of state government and the University of Alaska; it does not mean the Alaska Railroad Corporation or an agency of the judicial branch of government. (§ 2 ch 53 SLA 1987)

## Chapter 21. Department of Administration.

### Article

- 1. Department Functions (§§ 44.21.020, 44.21.025, 44.21.050)
- 3. Automatic Data Processing (§§ 44.21.150, 44.21.160)
- 4. Older Alaskans Commission (§§ 44.21.230 — 44.21.240)
- 5. Alaska Council on Science and Technology (Repealed)
- 6. Alaska Public Broadcasting Commission (§§ 44.21.266, 44.21.268)
- 7. Telecommunications (§§ 44.21.300 — 44.21.330)
- 8. Office of Public Advocacy (§§ 44.21.410, 44.21.450 — 44.21.470)

### Article 1. Department Functions.

Section	Section
20. Duties of department	50. [Repealed]
25. [Repealed]	

**Sec. 44.21.020. Duties of department.** The Department of Administration shall

- (1) [Repealed, § 4 ch 97 SLA 1976.]
- (2) make surveys and studies to improve administrative procedures, methods, and organization;
- (3) keep general accounts;
- (4) approve vouchers and disburse funds for all purposes;
- (5) operate centralized purchasing and supply services, and necessary storerooms and warehouses;

(6) allot space in state buildings to the various departments according to need and available space;

(7) supervise telephone, mailing, messenger, duplicating, and similar services adaptable to centralized management;

(8) administer the public employees' retirement system and teachers' retirement system;

(9) administer a statewide personnel program, including central personnel services such as recruitment, examination, position classification, and pay administration;

(10) administer the Alaska Pioneers' Homes;

(11) administer and supervise a statewide automatic data processing program;

(12) *[Repealed, E.O. No. 40, § 6 (1979).]*

(13) study, design, implement, and manage the telecommunications systems and services of the state under AS 44.21.305 — 44.21.330. (§ 8 ch 64 SLA 1959; am E.O. No. 30 (1968); am § 1 ch 170 SLA 1972; am § 4 ch 97 SLA 1976; am § 1 ch 118 SLA 1976; am E.O. No. 40, § 6 (1979); am E.O. No. 50, § 7 (1981))

Editor's notes. — This section is set out to change the internal reference in paragraph (13) to reflect 1987 legislation.

*Sec. 44.21.025. Contracts to operate vending facilities in state buildings. [Repealed, § 62 ch 21 SLA 1985.]*

*Sec. 44.21.050. Penalty for allowance of false, unjust or illegal claims. [Repealed, § 4 ch 51 SLA 1985.]*

### Article 3. Automatic Data Processing.

#### Section

150. Declaration of purpose

160. Powers and duties of Department of Administration

**Sec. 44.21.150. Declaration of purpose.** It is the purpose of AS 44.21.150 — 44.21.170 to designate the Department of Administration as the department responsible for the operation and management of automatic data processing resources and activities of the executive and legislative branches of state government and the judicial branch to the extent requested by that branch, to provide for cooperation between the department and the Telecommunications Information Council in the Office of the Governor, and to provide for periodic review of state automatic data processing procedures and mechanisms. It is further the purpose of these sections to encourage cooperation between the state government and local governments in the use

of automatic data processing systems. (§ 2 ch 170 SLA 1972; am § 1 ch 123 SLA 1986; am § 3 ch 53 SLA 1987)

*Effect of amendments.* — The 1986 amendment in the first sentence substituted "and" for a comma preceding "legislative," deleted "and judicial" preceding "branches" and inserted "and the judicial branch" to the extent requested by that branch.

The 1987 amendment inserted "to provide for cooperation between the department and the Telecommunications Information Council in the Office of the Governor" in the first sentence.

**Sec. 44.21.160. Powers and duties of Department of Administration.** (a) Except as otherwise provided in (g) of this section, the department shall comply with the state information systems plan adopted by the Telecommunications Information Council in the Office of the Governor in providing automatic data processing services responsive to the needs of state government.

(b) To carry out (a) of this section the department may, consistent with the state information systems plan adopted by the Telecommunications Information Council and with the departmental information systems plan,

(1) maintain a central staff of systems analysts, computer programmers and other staff members sufficient to provide systems analysis and computer programming support required by the executive and legislative branches of state government;

(2) develop and maintain both short-range and long-range data processing plans for state government and provide managerial leadership in the use of automatic data processing;

(3) review all budget requests for automatic data processing services and recommend to the Telecommunications Information Council and the governor approval, modification, or disapproval;

(4) recommend implementation priorities of requested data processing systems;

(5) determine and satisfy the data processing equipment and supply requirements of the executive and legislative branches, departments, and agencies of state government;

(6) provide all facilities, equipment, and staff required to convert data to a form suitable for processing on automatic data processing equipment;

(7) develop and publish systems analysis, computer programming and computer operations standards;

(8) review state automatic data processing systems to encourage effectiveness, measure performance, and assure adherence to the standards developed under AS 44.21.150 — 44.21.170;

(9) develop and conduct an automatic data processing training program designed to serve the technical and managerial needs of state government;

(10) charge a state agency or other governmental agency for the cost of the automatic data processing services provided or procured by the department for the agency.

(c) The department may cooperate with political subdivisions of the state in the development and operation of data processing systems and may allow for the use of state facilities by political subdivisions.

(d) In accordance with the state information systems plan adopted by the Telecommunications Information Council, the department and the University of Alaska may develop and implement a plan for the integration of automatic data processing facilities of the university with the state facilities.

(e) If the action is not contrary to the state information systems plan adopted by the Telecommunications Information Council, this section does not prohibit

(1) the department from obtaining necessary contractual assistance for automatic data processing activities;

(2) the legislature from recruiting and employing data processing personnel or from obtaining necessary contractual assistance for automatic data processing activities;

(3) the judicial branch from establishing independent data processing policies and implementation procedures; however, the policies and procedures must permit information exchange and implementation procedures compatible with other branches of government whenever practical.

(f) The department shall provide for the effective transfer of information by telecommunications through the establishment of compatible systems and common standards.

(g) The department shall provide or procure automatic data processing services under AS 44.21.150 — 44.21.170 for the judicial branch to the extent requested by that branch, and may charge the branch for the services.

(h) The commissioner of administration shall separately account for data processing services fees charged to political subdivisions and deposited in the general fund. The annual estimated balance in the account may be used by the legislature to make appropriations to the department to carry out the purposes of this section. (§ 2 ch 170 SLA 1972; am E.O. No. 50, § 3 (1981); am §§ 2 — 4 ch 123 SLA 1986; am § 68 ch 138 SLA 1986; am §§ 4 — 7 ch 53 SLA 1987; am § 38 ch 85 SLA 1988)

Revisor's notes. — Subsection (h) was enacted as (g). Renumbered in 1986.

Effect of amendments. — The first 1986 amendment at the beginning of subsection (a) substituted "Except as otherwise provided in (g) of this section, the" for "The"; in subsection (b) substituted "the" for "all" preceding "branches" in

paragraph (5), deleted "all" following "review" in paragraph (8), added paragraphs (10) and (11) and made a minor, related punctuation change, and added subsection (g).

The second 1986 amendment added subsection (h).

The 1987 amendment in subsection (a)

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(4) appoint unpaid advisory committees to assist in development of programs for public television broadcasts;

(5) provide assistance to licensed commercial broadcasting stations for the broadcast of public affairs programming.

(b) In performing its duties and exercising its authority under AS 44.21.256 — 44.21.290, the commission may not exercise control over the specific content or airing of any program material. (§ 1 ch 153 SLA 1970; am § 5 ch 87 SLA 1976; am E.O. No. 50, § 5 (1981))

Editor's notes. — This section is set out above to correct an error in the main pamphlet.

Article 7. Telecommunications.

Section	Section
300. [Repealed]	315. Telecommunications services
305. Commissioner's responsibility	320. Telecommunications operations
310. Telecommunications powers and duties	330. Definitions

Sec. 44.21.300. Telecommunications divisions. [Repealed, E.O. No. 66, § 6 (1987).]

Sec. 44.21.305. Commissioner's responsibility. The commissioner shall

(1) provide executive direction for the activities of the department related to telecommunications; and

(2) assure that department activities in no way constitute an influence on the content or airing of programming, and report to the governor and the Alaska Public Broadcasting Commission any request or attempt by an employee of the state to influence the content or airing of program material. (E.O. No. 50, § 9 (1981); am E.O. No. 66, § 2 (1987))

Effect of amendments. — The 1987 amendment substituted the present catchline for "Deputy commissioner," repealed subsection (a), which read "The telecommunications divisions shall be administered by a deputy commissioner of the department appointed by the commissioner," deleted former subsection designations (a) and (b), and in the present text

deleted "deputy" preceding "commissioner" in the introductory language, substituted "department related to telecommunications" for "telecommunications divisions" in paragraph (1), and in paragraph (2) substituted "department" for "division" and deleted "the commissioner" following "governor."

Sec. 44.21.310. Telecommunications powers and duties. (a) In accordance with the state information systems plan adopted by the Telecommunications Information Council and with the departmental information systems plan, the department shall

(1) advise the council and the governor on matters of policy and comprehensive state planning for telecommunications services;

(2) make an annual report to the governor and to the legislature on the activities of the department;

(3) coordinate, manage, and supervise state programs in telecommunications, including the management of those telecommunication services for the state obtained from common carriers and from the communications industry;

(4) when requested, provide technical and consulting assistance to the executive, judicial, and legislative branches of state government, to the University of Alaska, and to private noncommercial entities which request that assistance in facility procurement and leasing and in identifying long-range goals and objectives for the state and its political subdivisions in all aspects of telecommunications, including public, educational, and instructional telecommunications;

(5) prepare and maintain a state comprehensive telecommunications development plan to further state telecommunications development and to meet state telecommunications needs and prepare and maintain a comprehensive inventory of all state communications facilities;

(6) whenever feasible, procure services from private enterprise or certified and franchised utilities and contract for the construction, management, operation, and maintenance of telecommunications systems, and develop a procurement policy consistent with AS 36.30 (State Procurement Code); the procurement policy must seek to achieve the maximum benefit to the public, and methods of procurement, including lease, purchase, rental, or combinations of lease, purchase, and rental, must be selected on the basis of factors such as the ratio of long-range costs versus benefits, life cycle costing, and the costs to the communications industry to the extent that these costs may affect local and long distance basic telephone rates; procurement, contracting, construction, and maintenance under this paragraph is governed by AS 36.30;

(7) provide information and assistance to state agencies to promote governmental coordination and unity in the preparation of agency plans and programs involving the use of telecommunications;

(8) apply for and accept federal and private money, property, or assistance, that may be appropriated, granted, or otherwise made available to the department and use and disburse money and property for purposes consistent with AS 44.21.305 — 44.21.330 and AS 44.21.256 — 44.21.290, subject to reasonable limitations imposed by the grantor;

(9) participate with other governmental units in planning, and assist local governments and governmental conferences and councils in the state in planning and coordinating their activities relating to telecommunications;

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(10) provide for the orderly transition to new telecommunications services and systems by state agencies;

(11) serve as a clearinghouse for information, data, and other materials which may be necessary or helpful to federal, state, or local governmental agencies in the development of telecommunication systems;

(12) coordinate department services and activities with those of other state departments and agencies to the fullest extent possible to avoid unnecessary duplication; and

(13) provide that all activities of the department are responsive to state statutes and regulations, and to the regulations and rulings of the Federal Communications Commission.

(b) The department may

(1) coordinate its functions with local, regional, state, and federal officials, private groups and individuals, and with officials of other countries, provinces, and states;

(2) enter into contracts and subcontracts on behalf of the state to carry out the provisions of AS 44.21.305 — AS 44.21.330;

(3) act for the state in the initiation, investigation, and evaluation of, or participation in, programs related to the purposes of the department which involve more than one government or governmental unit;

(4) on behalf of the state, apply for, accept, and expend gifts or grants made to the state if the gifts or grants are for the purposes of furthering the objectives of the department; and

(5) hold public hearings to obtain information for the purpose of carrying out the provisions of AS 44.21.305 — 44.21.330.

(c) The department may not attempt to influence or affect the content or airing of program material. (E.O. No. 50, § 9 (1981); am § 42 ch 106 SLA 1986; am § 9 ch 53 SLA 1987; E.O. No. 66, § 3 (1987))

Effect of amendments. — The 1986 amendment, effective January 1, 1988, in paragraph (6) of subsection (a), substituted "consistent with AS 36.30 (State Procurement Code)" for "under AS 37.05.010 — 37.05.410" near the beginning and added "procurement, contracting, construction, and maintenance under this paragraph is governed by AS 36.30" at the end.

The first 1987 amendment substituted the present catchline for "Powers and duties of the telecommunications divisions," in subsection (a) in the introductory language substituted "department" for "telecommunications divisions, as directed by the deputy commissioner," in paragraphs (2), (8), and in (13), substituted "depart- ment" for "telecommunications divisions,

and in paragraph (12) substituted "de- partment" for "their"; in subsection (b) substituted "department" for "telecommu- nications divisions, as directed by the de- puty commissioner" in the introductory language, substituted "its" for "their" in paragraph (1), and substituted "depart- ment" for "telecommunications divisions" in paragraphs (3) and (4); and substituted "department" for "telecommunications di- visions" in subsection (c).

The second 1987 amendment in subsec- tion (a) added "In accordance with the state information systems plan adopted by the Telecommunications Information Council and with the departmental infor- mation systems plan, the" for "The" in the introductory language and inserted "coun- cil and the" in paragraph (1).

**Sec. 44.21.315. Telecommunications services.** (a) In accordance with the state information systems plan adopted by the Telecommunications Information Council and with the departmental information systems plan, the department shall provide

(1) technical consultation to educational and public telecommunications users;

(2) coordination and support to telecommunications services for instruction, including technical assistance and assistance in preparation of applications for grants related to program development as may be requested by

(A) public school districts and the Department of Education;

(B) the University of Alaska; and

(C) other state agencies as approved by the commissioner;

(3) coordination and support for health and safety-related functions, including the administrative and client services provided by state, federal, and private agencies;

(4) coordination and support to telecommunications services for public participation in state-financed services, including the public hearing process, as may be statutorily required or otherwise appropriate;

(5) assistance, through design, development, and promotion, to local school districts or other local and regional education agencies for the regionalization of instructional telecommunications services;

(6) establishment of operational policies for public telecommunications services other than public broadcasting; and

(7) assistance to the Alaska Public Broadcasting Commission and any commission-designated subcommittees, as necessary to perform assigned department functions; the department shall cooperate with the commission and subcommittees in order to develop policies which are responsive to the user groups which are represented on the commission.

(b) Subject to available funding, the department may make grants to educational and public telecommunication users except grants for public broadcasting purposes.

(c) The department shall study, plan, and develop integrated instructional telecommunications services for all residents of the state, and shall annually report on current fiscal year instructional telecommunications activities and, after public hearings, submit to the governor and the legislature an annually updated long-term development plan prepared in consultation with the Department of Education, the University of Alaska, local school districts, and other local and regional education areas.

(d) The department shall, after public hearings, submit to the governor an annually updated long-term development plan for teleconferencing facilities and services, including facilities and services used both by state agencies and groups other than state agencies.

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(e) The department may not own, operate, or be the licensee of a public noncommercial broadcast station or production center.

(f) Nothing in this section implies department responsibility for programming content. Program design, production, and use are the responsibility of the program-sponsoring agency or other entity, not the department. (E.O. No. 50, § 9 (1981); am § 10 ch 53 SLA 1987; E.O. No. 66, § 4 (1987))

Effect of amendments. — The first 1987 amendment deleted "Division of" at the beginning of the catchline; repealed former subsection (a), which read "The division of telecommunications services shall be administered by a director appointed by the commissioner," designated former subsections (b)-(g) as present subsections (a)-(f), in subsection (a) substituted "department" for "division of the telecommunications services" in the introductory language, deleted "deputy" preceding "commissioner" in paragraph (2)(C), and in paragraph (7) substituted "department" for "division" in two places,

in subsections (b) through (e) substituted "department" for "division of telecommunications services," and in subsection (f) substituted "department" for "division" in two places.

The second 1987 amendment in subsection (a) added "In accordance with the state information systems plan adopted by the Telecommunications Information Council and with the departmental information systems plan" at the beginning of the subsection and deleted "deputy" preceding "commissioner" in paragraph (2)(C).

Sec. 44.21.320. Telecommunications operations. (a) Except as provided in (d) of this section, the department may, consistent with the provisions of AS 44.21.310(a)(6)

(1) plan, design, construct, manage, and operate all telecommunications systems owned or leased by state agencies;

(2) manage centrex and other telephone-related services of state agencies;

(3) be responsible generally for telecommunications systems and design for state agencies; and

(4) coordinate with state agencies in performing their data and word processing tasks.

(b) Within the limits of available financing, the department shall administer and operate the satellite television project, by

(1) coordinating with the satellite television user groups and entities; and

(2) providing liaison, management support, and technical assistance for the satellite television project.

(c) Decisions and policies relating to programming under the satellite television project, including scheduling and allocation policies, may not be made by the department, but may only be made by a network that is representative of participating rural television users, by commercial broadcast users or by other affected participating user groups and entities under procedures provided by statute or, if no statute applies, then by agreement of the affected user networks or groups. The department shall assist users in preparing agreements that may be required under this subsection.

(d) The department may not engage in any activity which interferes with a contract or program right relating to commercial television programming, including but not limited to any right protected by copyright.

(e) Nothing in AS 44.21.305 — 44.21.330 prohibits a state agency from developing telecommunications systems within its own agency if the agency is in compliance with the state information systems plan adopted by the Telecommunications Information Council and with the agency's own information systems plan and if the commissioner gives written authorization for the agency to engage in its own design, development, management, or operation. The commissioner may authorize independent development only upon a showing of necessity. A description of all authorization under this subsection must be included in the annual report required under AS 44.21.310(a)(2).

(f) A state agency authorized to develop an internal telecommunications system shall, whenever feasible, coordinate its design development, management, and operation with the department. (E.O. No. 50, § 9 (1981); am §§ 2 — 5 ch 11 SLA 1985; am § 11 ch 53 SLA 1987; E.O. No. 66, § 5 (1987))

**Revisor's notes.** — As amended in 1987 the internal reference in the introductory language of (a) of this section read "(f) of this section." It was changed to "(d) of this section" to correct a manifest error.

**Effect of amendments.** — The 1985 amendment substituted "operations" for "systems" in the catchline and in subsections (a), (b), and (g), and in subsection (c) substituted "telecommunications operations" for "telecommunication systems."

The first 1987 amendment deleted "Division of" at the beginning of the catchline; repealed former subsection (a), which read "The division of telecommunications operations shall be administered by a director appointed by the commissioner"; designated former subsections (b)-(g) as

present subsections (a)-(f); in subsections (a) and (b) substituted "department" for "division of telecommunications operations"; in subsection (c) deleted "divisions of telecommunications or" preceding "department" in the first sentence; in subsection (d) deleted "divisions of telecommunications and" preceding "department"; and substituted "department" for "division of telecommunications operations" at the end of subsection (f).

The second 1987 amendment inserted "the agency is in compliance with the state information systems plan adopted by the Telecommunications Information Council and with the agency's own information systems plan and if" in the first sentence of subsection (e).

**Sec. 44.21.330. Definitions.** In AS 44.21.305 — 44.21.330

- (1) "commissioner" means the commissioner of administration;
- (2) "department" means the Department of Administration;
- (3) "public broadcasting" means the delivery of radio or television noncommercial programming intended for the general public by any method of telecommunications;
- (4) "public telecommunications" means telecommunications which serve public broadcasting, general educational, instructional, medical, safety, emergency, or public participation functions;
- (5) "state agencies" means all departments, divisions, and offices in the executive branch of state government; it does not mean an agency

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of the legislative or judicial branch of government or the University of Alaska;

(6) "telecommunications" means the transmission and reception of messages, impressions, pictures, and signals by means of electromagnetic transmission with or without benefit of a closed transmission medium including all instrumentalities, facilities, apparatus, and services, whether conveyed by cable or wire, radiated through space, or transmitted through other media within a specified area or between designated points;

(7) "telecommunications systems" means those systems in which the principal service and functions are telecommunications. (E.O. No. 50, § 9 (1981); am E.O. No. 66, § 6 (1987))

Effect of amendments. — The 1987 amendment repealed paragraph (3), which read "'deputy commissioner' means the deputy commissioner in the department who administers the telecommunications divisions."

Article 8. Office of Public Advocacy.

Section

- 410. Powers and duties
- 450. Civil liability of volunteer guardians
- 460. Nonattorney volunteer guardians ad litem

Section

- 470. Definition

Sec. 44.21.410. Powers and duties. (a) The office of public advocacy shall

(1) perform the duties of the public guardian under AS 13.26.360 — 13.26.410;

(2) provide visitors and experts in guardianship proceedings under AS 13.26.131;

(3) provide guardian ad litem services to children in child protection actions under AS 47.17.030(e) and to wards and respondents in guardianship proceedings who will suffer financial hardship or become dependent upon a government agency or a private person or agency if the services are not provided at state expense under AS 13.26.112;

(4) provide legal representation in guardianship proceedings to respondents who are financially unable to employ attorneys under AS 13.26.106(b), to indigent parties in cases involving child custody in which the opposing party is represented by counsel provided by a public agency, to indigent parents or guardians of a minor respondent in a commitment proceeding concerning the minor under AS 47.30.775;

(5) provide legal representation and guardian ad litem services under AS 25.24.310; in cases arising under the Uniform Interstate Compact on Juveniles (AS 47.15); in cases involving petitions to adopt a minor under AS 25.23.125(b) or petitions for the termination of paren-

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## ***Managing Information Resources: New Directions in State Government***

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### **EXECUTIVE SUMMARY**

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### **Introduction**

The role of state government has expanded significantly in recent years because of growing state activism, fiscal pressures, and federal action that assigns states additional responsibilities. Growing investments in information and information technologies, both as resources and tools for managing state government programs, reflect the increasing importance of information resources management (IRM) as a strategy for dealing with the states' expanding roles. The findings in this report are the result of the first exploratory study of IRM in state government.

### **The Research Effort**

The study was a joint effort between the National Association for State Information Systems, Inc. (NASIS), information processing industry companies, and Syracuse University's School of Information Studies which directed the research. The principal objectives of the study were to inventory and analyze the management policies and practices applied to information and information technology in state governments and to share those approaches. The research team examined the information technology areas of data processing, telecommunications, and office systems. Information management areas included in the scope of the study were records management and state library services. Management functions examined in-depth included organization, planning, policy formulation, budgeting and accounting, personnel management, and procurement processes. While the primary research focused on the central state office level, case studies and surveys of agency data processing and program officials provided agency perspectives.

Most of the state information was collected during the period of August 1988 to April 1989. The study purposely used a variety of research methods. Surveys of agency information system directors and program managers, and records managers and state library personnel provided a broad cross-section of issues and approaches. Direct interviews probed particular areas and were tailored to the interview situation. Document reviews obtained information on formal management goal and practices. Case studies resulted in analyses of single state experiences and comparisons with other states.

## Introduction to the Findings

Information technologies are the powerful tools that lead to managing with information in an environment of strong service delivery and regulatory expectations. States see information management and information technology management as inseparable partners. We found that IRM cannot, and should not, be defined by a single model or approach across the states. States are adopting approaches that best respond to their political directives, executive branch management philosophy and style, existing resources, and ability to adjust to management change. However, there is a similar trend across the states to better manage information resources.

In general, all levels of computing environments (mainframe, departmental, and microcomputers) tend to be encouraged across the states. The interdependence of information technologies and databases to address service delivery, regulation, and decision making is well recognized. Some states are moving strongly to improve information management processes across state government, some considering intergovernmental and client information flows as well. Other information resources management areas such as state library services and records management are undergoing considerable change as they define service and compliance roles, work on securing more top management attention and resources, and adopt new technologies.

In the management functions of information resources budgeting, personnel, and procurement, adjustment to the increasing use of information technologies is also apparent. The approaches are diverse and much work is left, but the theme of better management and responsive management goals, structures, and responsibilities remain. On the agency level, we found that typically size and/or function make considerable differences in IRM structures, information sharing, the importance of new technologies, perception of data processing services, and attitudes about the organizational effects of computers.

### Converging Trends

We found that IRM should be placed in a context of public management reform, information technology change, and resources management development. Public management has continually adjusted to find resource management solutions and adopt management techniques over the years. Management reform efforts take a very long time and involve elected and career officials in the legislative and executive branches. Government management changes reflect political traditions, the cli-

mate for change, and existing management structures and processes. Traditionally, central control and coordination have normally been the thrust of those efforts. Even budgeting and human resources management processes, subjects of considerable management effort over almost a century, are still unsettled. The driving themes of budget and central control in public management plus increased demands for new or more effective services has found a ready complement in the productivity and service delivery improvements that information technology offers.

IRM is a new management function that has been in place less than ten years in the federal government and for shorter periods in most states that have adopted IRM organizational arrangements and concepts. Records management and library services have a older history, but they too have seen major management changes in the last twenty years. Records management has suffered from lack of management attention and resources; state library services are responding to information technology changes that can greatly aid in service delivery.

Information resources management has adjusted as use of technologies in organizations has changed. Computer and communication networking and end-user computing and office automation are the dominant themes in the 1980s. Telecommunications and electronic data processing, once managed as separate entities, now require at least policy level coordination as the technologies have converged.

### Organization, Planning, and Vision

From our in-depth study of 23 states, supplemented with information from other states, we found that there has been considerable change in organization, planning, and information resources goals in the past several years. A majority of states have had new legislation and/or executive orders from 1983 on that have authorized new or revised information resources management roles. The directives have included organizational changes at policy, operational, and control levels, and focused attention on the planning and procurement processes, particularly for information technology.

As a result, states have made major changes in central state organizations. Shown in Figure 1, the largest number of data processing operational units are placed in departments of administrative service or administration; telecommunications operations in general services departments; and policy and planning units in financial departments.

Figure 1. Information Technology-Related Functions in the Hierarchy (23 States)

Information Technology Function Reports To:	Data Processing	Telecommunications	Policy/ Planning
Admin. Services or Office of Admin. Comptroller, Finance, Budget, Treasury	30.4%	21.7%	17.4%
Finance & Admin., Management and Budget	21.7%	17.4%	34.8%
General Services	17.4%	17.4%	8.7%
Planning and Policy	13.0%	34.8%	4.3%
Governor, Executive Department	4.3%	4.3%	4.3%
Other	4.3%	26.1%	4.3%
	8.7%	0.0%	

There has been a trend in recent years to separate policy and planning from operational units. New roles or roles with more emphasis at the state level include research and development, planning administration, procurement and acquisition, policy formulation and administration, central coordination and oversight, and service to client agencies. Figure 2 shows the primary functions of a composite information technology/management organization across the states we studied in-depth.

Legislative directives and/or executive orders have resulted in high level policy and management control structures to address management concerns; these are either external bodies or a separate unit within the central state organization. Membership on external advisory or decision-making groups is diverse although the bulk of the membership belongs to state management. The key responsibilities of these groups appear to be policy formulation, planning, and assessing future information technology directions.

Policy administration is an area of increasing emphasis, particularly to facilitate networking and protection of information and information handling assets. Most of the states we studied in-depth have policies for hardware standards, security, contingency planning, procurement, and planning. States indicated that policy groups were revisiting most of the current policy directives and assessing what new policy initiatives were needed to better plan for and manage information and information technology activities.

The current focus in the planning process tends to be on data processing and data communications with well over half the states requiring an information systems/information technology planning process. Less than half

have requirements for communications plans. Only a few states have "across the board" state agency information technology/information management plans that would encompass data processing, telecommunications, and office systems. In addition, planning requirements generally are placed on executive branch agencies. Statewide planning is an emerging trend, but it is unclear if states are setting strong strategic directions for information resources to guide agency planning. Some states are including local government issues in their planning process.

The planning process is typically characterized by extensive detail that focuses more on short-range budget justification and procurement for individual projects rather than longer-term and/or strategic issues. The majority of states do prepare a plan before the budget process begins. Budgeting and procurement processes tend to have considerable input by the information technology or information policy office that reviews or consolidates the agency plans. The agency and statewide plans are clearly seen as budget documents.

Goals listed in current state plans focus on a number of specific areas: administrative systems, end-user computing, information sharing and functional applications, information technology management, information management, telecommunications, human resources management, and statewide management action. State planning priorities appear to fall in the areas of telecommunications, information sharing and functional applications, and information technology management such as assessing new technologies and enhancing security. Many medium-size and small states are trying to deal with establishing or improving planning and telecommunications management.

Figure 2. Primary Functions: Composite Information Technology Organization

Functions	Activities
Planning	Do statewide information planning Review and/or approve agency plans Provide technical assistance in plan development
Budgeting	Assist or prepare state information resources budget Provide agency budget recommendations to Governor's staff
Support Services	Provide consulting in information processing, telecommunications, office systems development Provide security and risk management guidance/training Provide training in applications use, planning Run information centers
Policy Administration	Formulate policies, procedures, and guidance Define information/information technology architecture and standards
Information Services	Provide central information locator services Guide records management and information access activities
Research and Development	Monitor technological developments and assess governmental applications potential Design and evaluate pilot studies
Systems/Services Operations	Provide telecommunications services/network management Operate data centers Manage information processing services/networks Provide/coordinate reprographics and printing services Run statewide administrative systems Do central data administration and database management Analyze workload and resource utilization data Do billing and rate setting
Systems Development	Design telecommunications systems and software Design information processing systems and software Design office systems and software
Procurement/Acquisition	Provide vendor "gateway" to agencies for software, hardware, information services Assess/approve procurement requests Handle contracts
Central Coordination/Oversight	Monitor, evaluate, and report on agency information resource management including systems and policies Coordinate with central information/information technology councils/commission Coordinate multi-agency, multi-functional systems design and implementation Review critical information systems projects

An important theme across at least half of the states studied in-depth is the expression of an IRM "vision" either in the form of policy statements or strategic directions. Figure 3 presents a consolidation of these statements. These statements and directions provide the conceptual framework for IRM and a way to provide a rationale for planning, policy control, and service goals. With some exceptions, linkages with other information management groups such as records management, archives, and/or library services are not directly included in the strategic directions and policy statements. While the statements do implicitly suggest such linkages, it is unclear if the central state agencies plan to interpret them to include such action.

### Information Technology Strategies and Directions

Given the importance of information technologies, the study focused considerable attention on information technology strategies and directions in data processing, telecommunications, and office systems. We found that central data center mainframe operations vary widely. In larger states, data center computing resources tend to be decentralized; the reverse is true in smaller states. Some states studied in-depth are streamlining and consolidating data center operations for better control, service delivery, and cost efficiencies. Larger state central data centers generally operate mainframe services for smaller agencies and run statewide administrative systems. This accommodates the needs of smaller agencies who do not have the size and/or application demands to staff their own centers and ensures standardization and efficiency of administrative policies and processes.

In all but the smaller states, functional areas such as human services, transportation, criminal justice/law enforcement, and taxation and finance tend to have their own data center located outside a central state facility. Both departmental computing and interactive processing with the central state mainframes seem to be on the upswing. Several medium-sized to smaller states are automating or enhancing statewide administrative systems such as accounting, budgeting, personnel, financial/payroll, procurement, and inventory control. Larger states apparently have mostly completed similar automation. There is a wide range of effort from little or no attempt, to development of comprehensive, integrated multi-functional information systems. States appear to be encouraging shared systems and information. Geographic information systems is an emerging area of emphasis, primarily for natural resources/land man-

agement, and transportation functions. Many of these states see the development of telecommunication networks as the missing piece in moving towards multi-functional information systems.

Central state level offices have a varying level of knowledge about agency computing resources. State level offices seem to inventory the large computers individual agencies are using, but do not systematically obtain information about minicomputers or microcomputers that "stand-alone" at the agency level. State offices are typically more interested in equipment such as workstations and terminals that connect with state data centers since this affects access management.

The range of end-user support for computing varies among the states. Typically, larger states have a central state information center(s) that provides considerable support for all levels of computing (mainframe, departmental, and microcomputers). In smaller states, the focus of the information center is microcomputer use. In larger states, agencies themselves generally have information centers that focus on microcomputer use and frequently on other levels as well. Information locator systems vary in sophistication across the states: Only a few states have a state-level information locator system that goes beyond very limited database sources and only a few states are exploring information locator implementation or enhancements.

A major level of effort in information technology strategies is telecommunications network development. States are either studying, building, or have built digital backbone networks that have the capability to integrate voice, data, video, and/or image communications and will expand communications capabilities to all parts of the state. For the most part, the new networks take advantage of the existing infrastructure or are building the networks in stages. There is a diversity in the extent to which current network equipment and/or lines are owned by the state or leased from outside sources. A variety of transport technologies are used: Fiber optic cable, T1 lines, and microwave appear to be the dominant media. For the most part, university and college educational applications dominate video communications and law enforcement and public safety applications dominate radio communications.

Most states appear committed to Integrated Services Digital Network (ISDN), but are waiting until it is more widely available and tested. While the new networks will have the capacity to handle video and image com-

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 Figure 3. Information "Vision" Themes
 

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### STRATEGIC ASSETS

Information and information handling technologies are valuable assets of the state and should be managed for the benefit of the State and the public.

Information should be collected and created only in fulfillment of an agency's mission and/or for statewide applications and should not duplicate that available from other sources. Managers must define the purposes of their organization and structure the design and use of information to implement those purposes, working to minimize the burden imposed on those who must provide the information.

Information should be managed and shared across organizational lines; it is owned by the State and the collecting or creating agency is its custodian. A statewide perspective should consider the multiple and diverse needs of agencies across organizational boundaries, including the necessary linkages to other levels of government.

### MANAGEMENT PRIORITIES

The State must develop an effective management approach for information resources, include planning, policy development, budgeting, procurement, and service delivery. The approach should include full involvement of those dependent on the information resources and consider the impact on the information policies and activities of other levels of government. Planning, budgeting, and appropriations should be linked together to ensure mission support.

Both central management groups and agencies have appropriate roles in the management of information resources. The central management group should provide statewide rules and standards, monitor and ensure compliance with those standards, provide management and technical assistance, and ensure statewide information resources needs are considered along with the needs of individual departments and agencies.

Fundamental management responsibilities should not be delegated to operational staff.

An information architecture is vital to defining the State's direction in information and information technology management. This should include the appropriate mix of centralized, decentralized, and distributed processing.

Information life cycle management should be a priority and agencies should manage their records on an ongoing process.

### OPERATIONAL PRIORITIES

A statewide communications network is vital for information exchange and multi-functional approaches.

Standards are necessary for information exchange, ensuring compatibility with existing systems, and the best use of information technology investments. Up-to-date technologies best serve information management goals. Competitive and equitable procurement policies should ensure the cost-effective and timely acquisition of these assets.

Information should be accessible to the public unless protected by privacy considerations. Information in a system should be protected and used properly.

Information systems users must develop skills in the management and use of information and information-handling technologies, including developing innovative methods to use information resources in decision-making and service delivery.

Policy making and planning functions should be separated from engineering and other operational functions in central management approaches.

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munications, it is clear that data and voice communications are the first priority for operational use. Voice and data communications management at the state level increasingly must coordinate efforts as the consolidation of existing networks and the development of new integrated networks continues. However, there still remains a multitude of disparate voice, video, and data networks controlled by state agencies and their status under state-wide consolidation efforts remains unclear.

The state central telecommunications office handles a multitude of duties ranging from coordinating long distance services to developing new technologies. Their responsibilities underscore the central utility operation of voice communications and the service demands placed on the telecommunications offices. Virtually all have been integrally involved in the development of new networks. Less than half of the states studied in-depth operate their own phone company. Larger states generally operate and manage a network control center. Most states use two or more long distance options. Central state offices generally do not centrally manage local area networks or wide area networks.

Office systems (also known as office automation systems) until recently have not received much state level interest. Well over half of the states studied in-depth are not directly involved in the planning and/or policy-making for office systems; this generally has been left to the individual agencies with the central office providing technical assistance. State officials indicate that end-user tools such as word processing, electronic spreadsheets, data base management programs, and statistical and graphic packages have generally penetrated most levels of state government; smaller states tend to have word processing and electronic spreadsheet applications. More recently, integrated office automation packages that combine these applications; communication tools such as electronic mail, voice mail, audio and video teleconferencing; and document handling tools such as facsimile, and electronic document exchange have penetrated the state office setting.

A review of state plans in administrative systems and specific program areas indicate that many states rely on state of the art technology and management, and coordination across the technologies of data processing, telecommunications, and office systems. It is not clear that interagency information sharing is necessarily considered in these specific plans. Many state goals, however, do include the development of functional perspectives in agency information technology applications.

Some states are fostering innovation through formal organizational structures for research and development of information technology applications. In general, states are anticipating information technology and management changes in data processing and telecommunications. These include the use of powerful small computer systems, centralization and decentralization of data holdings, centralization and decentralization of information processing, local level involvement, growth of end-user computing, changing use of data centers, increased networking and data sharing, increased image processing, and increased demands for storage capacity and access. For telecommunications, states see as major changes the development of digital backbone networks, communications policies and standards, telecommunications planning strategies, end to end control over major telecommunications facilities, new infrastructures with optical fiber and radio and microwave applications, new organizational structures and systems to address telecommunications needs and management, and network management solutions.

#### Human Resources Issues and Trends

We estimate there are well over 420,000 IRM-related jobs across the states representing almost 20 percent of executive branch state employees. Over 66 percent of these jobs are office systems (dominated by clerical titles), followed by data processing (16.0 percent), research and statistics (9.3 percent), communications (3.6 percent), archives and records (1.7 percent), libraries (1.4 percent), information services and products (1.3 percent), miscellaneous IRM-related jobs (0.1 percent), and information resource managers (less than 0.1 percent). A number of the states indicated there is a move toward reclassification of job titles to better represent the work in information technologies and resources.

State service job titles indicate a growing emphasis on telecommunications, office automation and end user computing, data base administration, policy development, planning, geographic information systems, information resources management, software development and support, and forms design. On compensation, state personnel departments note that there is still a considerable lag between government salaries and those in the private sector for information technology jobs. However, only a few states of those studied in-depth had compensation studies and only one of those was current. States report they are implementing higher pay grades for new positions and revising the pay grades for current positions. While personnel managers expressed a con-

cern for the seemingly pervasive problem of recruiting and retaining qualified data processing personnel, actual solutions for this problem were scarce. Most of the personnel officials interviewed believed that there were no special hiring or retention policies for IRM-related positions.

Training programs appear to be a bright spot. State employees have a wide range of courses offered them, often at little or no charge. Use of centralized facilities further enhances the learning process. The states are taking advantage of current and new technologies, such as computer-based training to educate and train their employees. While most states are basically concerned with offering technology oriented courses, some training efforts are beginning to have an IRM focus.

### Financial Management

We gathered accounting data from all 50 states and studied expenditures in-depth in 20 states. We found that states may be spending more than three percent of their executive branch operating budgets for the information, information technology, and the information personnel necessary to manage state government. In Fiscal Year 1987, this was \$15.6 billion per year and our examination of percentage increases over the years indicate this has grown to an estimated \$19.9 billion in Fiscal Year 1989.

Our study found that accounting code structures vary considerably. Built up over time, accounting codes frequently reflect the desire to maintain consistency in data collection and do not easily adjust to changing expenditure conditions. However, in the rapidly developing information resources area, accounting code structures may not be collecting critical information to guide management decision making. Or if information is collected, it may be collapsed into inappropriate categories or general "overhead" line items. This is an important point as there is evidence that the accounting object structures in many states are inadequate in providing program managers with sufficient information to monitor information resources that are cost factors in budgets of their programs. One of the weaker links is that many states have neglected to allow for detailed monitoring of information services, whether provided as inter-agency services, central agency services, or by private vendors.

There is a very wide range in the number of accounting object codes available in the 50 states to monitor expenditures on information resources. The average for the 50 states is 30 codes: an average of nine for data processing,

six for communications, eight for office systems, and six for other information products and services. Most of the states inventory data processing services costs in their accounting schemes and most track some type of data processing supplies. Many states do not account for software costs. The communications accounting codes in use do not generally recognize new categories of services, supplies, and equipment. Although many of the states enumerate telephone service costs, other types of expenditures, especially for equipment, are often lumped together under a general communications equipment code, or within a code for all equipment purchases. Radio and television costs are itemized in about half the states, primarily for tracking equipment expenditures.

Most states at least have a code for telecommunications, a code for postage, and a code for other communications. Supplies are most often a single object of expenditure in the office systems accounting code category. Office equipment is often coded to include office furniture. States generally do not distinguish between photocopying and printing. For information products and services, over two-thirds of the states capture costs of publications and periodicals in a unique object code. Most states itemize expenditures on advertising and publicity, differentiate costs associated with photographic products and services, and library costs. In most states, information resources appear not to be capitalized.

Total executive branch IRM expenditures range considerably in the states studied in-depth. The expenditures, excluding salaries, range between 0.7 percent and 4.7 percent of total executive branch expenditures in Fiscal Year 1987. With salaries included, the expenditures range from 1.4 percent to 7.7 percent. One of the major factors affecting the range of IRM expenditures is the extent to which the accounting schemes of the states capture the executive branch IRM expenditures. It is likely that total IRM expenditures as a percentage of total executive branch spending are greater than the states studied in-depth average of 1.8 percent, not including salaries. The percentage increases to 3.4 percent when personnel costs are included.

Excluding salaries, the largest share of all executive branch IRM expenditures is for communications activities, a little over 36 percent. Thirty-three percent are for data processing purposes. With the inclusion of salary data, office systems increases from 22 percent without salaries to nearly 36 percent; communications drops to 21 percent; information services costs almost doubles from eight percent to 13 percent; and data processing

costs remain the same. A majority of the non-personnel IRM costs in the states may be classified as expenses for services such as consulting.

Figure 4 shows per capita costs for selected line items that comprise IRM expenditures. (Comparisons are shown on a per capita basis to standardize the population differences between the states studied in-depth).

Generally, there have been sizeable increases in different classes of IRM expenditures over the years. The average biennial change for data processing was 25.5 percent; communications, 24.3 percent; office systems, 29.3 percent; and information products, 29.4 percent. Overall, total IRM expenditures increased 27.5 percent biennially. This yields an annualized rate of growth over a four year period of about seven percent.

### Procurement of Information Technology

We found procurement policies and practices vary in the information technologies that come under their jurisdiction. Some states take a broad orientation; others are narrow in procurement responsibilities for information technologies. Virtually all states have some form of competitive bid process, either legally mandated or as a regulation or operating procedure. The review, approval and purchase of information technology is generally not centrally located in any one state office. In most of the states it appears that information technology procurement is related to a strategic or long-range information resources planning and budget process.

In general, most states have similar methods for procuring information technology resources. These include requests for proposals, invitations for bids, sole source, emergency procurements, delegated authority, and the use of state or term contracts, shown in Figure 5.

Invitation for bids and request for proposals are generally the longest procurement processes, taking an average of 11 and 13 weeks respectively. Sole source and term contract procurement take a month; delegated authority for small purchases takes less than two weeks.

In addition, there are several major trends in the procurement process, including developing computerized procurement inventories, leveraging state buying power through a "state as one customer" approach, instituting installment purchase strategies, and developing specific training on the procurement process for agency personnel and on specialized topics for procurement officers.

Most states have some form of general procurement ethics policy, either as legislation or operating procedures. In addition, some of the states have addressed the ethical concerns directly related to procurement of information technology equipment and services.

### Records Management

We found that general records management functions in the states include providing standards, procedures, and techniques for records management; controlling and scheduling of records retention and disposal; establishing a state records management plan or program; and issuing rules and regulations for records management. Records Center services and vital records handling generally are primary services. Records management offices help state agencies through advising and technical assistance; inspecting and reviewing agencies' records management plans and practices; training of records management personnel, and reporting requirements. Additional functions which are less prevalent include records safeguarding, forms management, recommendations for technological improvements in records management, and responsibility for privacy protection.

In the legal authorities we reviewed, responsibility for records management functions is most commonly assigned to records management bodies such as records management divisions, councils, boards, or commissions. Records management responsibilities may also be found under the authority of archival units, library units, and various institutional combinations of records, archival, and library units. Half of the policy direction is in offices, boards, or commissions responsible for archives, forms, records management, public records, and records center management. The majority of states participating in the study reported that records management responsibility varies in the agencies. In many instances, states indicated that there were multiple persons responsible for the records management function in their agencies.

The state archives organization and function varies across the states. About half of the archives are located in an archive and records management office. Historical agencies, state library agencies and other state government departments also house the archival organization. States report that an enormous backlog of records are waiting to be archived and there is little attention being paid to current state records which have potential archival value. A final concern to archives is that preservation

Figure 4. Per Capita Composition of IRM Expenditures

FY 1987 Accounting Structure	State Sample Per Capita Mean
Total Data Processing	14.40
Services	6.53
Internal	6.28
Agency (Inter/Intra)	1.85
Central Data Processing Agency	6.13
External	1.83
Supplies	0.34
Hardware	5.81
Purchase	4.21
Capital Outlay	2.50
Other Purchase	0.92
Mainframe	0.48
Peripheral	1.09
Rent	0.82
Maintenance	0.83
Software	0.73
Purchase	0.54
Miscellaneous	10.10
Total Communications	11.60
General	1.04
Equipment	0.68
Capital Outlay	1.06
Other Purchase	0.47
Rent	0.11
Maintenance/Repair	0.17
Supplies	0.10
Services/Tolls	0.07
Other/Miscellaneous	0.69
Voice/Data	7.90
Capital Outlay	0.22
Other Purchase	0.88
Supplies	0.02
Services/Tolls	6.09
Telephone	4.17
External (Vendors)	2.43
Data Communications	0.70
Long Distance	1.74
Internal (State)	3.06
Local (Centrex)	2.00
Telegraph/Copier	0.01
Miscellaneous Services	4.26
Miscellaneous (Voice/Data)	10.10
Radio/Television	0.42
Mail	2.91
Postage Services External	2.67
Postage Services Internal	1.50

Continued on next page

Figure 4. Per Capita Composition of IRM Expenditures - continued from previous page

FY 1987 Accounting Structure	State Sample Per Capita Mean
Total Office Systems	7.52
Services	0.58
Office Supplies	1.68
Office Equipment	2.00
Capital Outlay	1.31
Other Purchase	0.97
Rent	0.24
Maintenance	0.54
Office Furniture	0.54
Duplication	2.81
Equipment	0.54
Services	0.95
Supplies	0.25
Photocopying	0.56
Equipment	0.24
Capital Outlay	0.14
Other Purchase	0.01
Rent	0.27
Maintenance	0.11
Supplies	0.22
Services (Copies)	0.38
Quick Copy (Internal)	0.79
Printing/Binding	2.33
Service-Internal	0.84
Service-External	1.29
Service (Not Otherwise Classified)	0.97
Miscellaneous	6.59
Total Information Services	2.98
Information Products	0.63
Publications	0.38
Other	0.25
Advertising and Publicity	2.17
Photography	0.35
Equipment	0.09
Services	0.14
Supplies	0.26
Microfilm, etc.	0.14
Libraries	0.26
Materials	0.24
Personnel Training Costs	0.04
Data Processing	0.04
Printing	0.00
Records Management	0.33
Storage Rent	0.05
Other Services	0.00

Figure 5. Methods of Information Technology Procurement (22 State Sample)

Method	Percent	(N=22)
Invitations for Bids	63.7	(N=14)
Delegated Authority for Small Purchases	59.1	(N=13)
Emergency Procurements	50.0	(N=11)
State or Term Contracts	45.5	(N=10)
Sole Source	36.4	(N=8)
Request for Proposals	31.8	(N=7)
Request for Information	9.1	(N=2)

Each state could have more than one response.

of historic documents needs to be given legislative support, as well as the financial means to store and retrieve information of enduring value to the state.

Electronic recordkeeping is an area of concern. Many records scheduling and retention plans in the states do not account for the access to, retention, and preservation of electronic records even though the enormous increase in the use of computers has led to the generation of electronic files and records at all levels of state government. There are generally no central, systematic procedures for retention of electronic records. A lack of understanding about records management, an absence of any centralized direction concerning electronic records, and insufficient resources have not facilitated the development of programs for the management of electronic records.

#### State Library Services

State library agencies generally have two major roles: providing leadership to and coordinating the state public libraries and providing library information services to state agencies. The range of services offered depends on the individual state library. Most state library agencies are the designated repository for state documents. In most instances, this is required by state law. State library agencies are generally either independent agencies governed by a library board or commission or are under the authority of the state education department. Generally, the number of state libraries has either remained the same or decreased over the last five years.

There is a growing trend towards using new technologies for better provision of and access to information resources in state government. This includes the use of commercially developed and marketed online databases, and the creation of online databases of state related information and resources. The majority of states began online services before 1981. Most states do not charge fees for online searches for state agencies. Almost all of the states do not allow end-users to directly access fee-for-service databases. The majority of states maintain some type of online database.

A focus on long range planning is very evident in the states. Strategic directions for library services to state government agencies include providing reference and research services, compiling reading lists and bibliographies, maintaining information from state and federal governments, loaning materials from other libraries, and providing special topic services. Information technology and/or policy offices are seen as having increasing influence on state library policies and services. Challenges for the future include agency coordination and resource sharing, obtaining the support of elected leaders, and coordinating the activities of various state library agencies.

#### Perspectives of Agency Information System Managers

Surveys of information system and program officials at the agency level in major functional areas provided agency perspectives. For information systems, surveys were sent to individuals with managerial responsibility for data processing or information management in state agencies.

Figure 6. Personnel and Budgets for Agency and Data Processing Unit by Agency Function

Function	Agency Total Personnel in 1988 (N=524) Average	Total Data Processing Personnel (N=521) Average	Agency Total Budget In \$1000 (N=462) Average	Data Processing Total Budget In \$1000 (N=368) Average
Commerce, Regulation and Economic Development	624	34	\$100,986	\$4,611
Education	608	23	\$57,828	\$1,714
Employment and Labor	874	51	\$35,945	\$5,689
Environment and Natural Resources	910	15	\$57,345	\$2,626
Health	3516	41	\$372,946	\$4,088
Human and Social Services	1887	49	\$256,843	\$6,415
Safety and Criminal Justice	1599	22	\$131,646	\$1,905
Transportation and Utilities	2941	62	\$481,916	\$14,462
TOTAL	1451	35	\$165,120	\$4,850

We found that there are clear, systematic differences in the size of data processing organizations in the agencies related to function, as shown in Figure 6. For example, data processing organizations supporting health and transportation functions operate within much larger organizations than those representing education or economic and commerce functions. There is some evidence that capital purchases as a percent of operational costs decline with size. Data processing organizations employing five or less full-time equivalent positions (FTEs) generally are in organizations that make smaller capital purchases such as microcomputers than the larger data processing organizations.

Almost 70 per cent of the data processing organizations' operating budgets support ongoing operations. Next in importance after ongoing operations is developing new applications. Only a very small proportion of the budget goes towards training. However, large organizations spend a smaller proportion of their budgets on training than small data processing groups, because smaller organizations are involved with newer end-user technologies.

The large organizations have been working with computer technology since the early to mid 1960's, while the small organizations date their beginnings to 1980. Trans-

portation organizations emerge as having the earliest adoption (1962) in terms of their first purchase of a computer. State health organizations are the latest adopters with their first purchase occurring in 1968 on average.

As shown in Figure 7, all organizations had access to at least one mainframe computer outside of their data processing organization, most likely the state's central data processing system service. The small organizations relied primarily on microcomputer technology. If an agency data processing group had less than two FTEs, it was primarily operating microcomputers. For organizations of between two and 20 FTEs, the number of microcomputers increased, but more significantly they also made use of minicomputers and hence some form of timesharing and networking. Once an organization employed more than 20 FTEs, it was of sufficient size to support mainframe computing. Employment and labor organizations had significantly less invested in microcomputers than any other functional groups.

Small data processing organizations have more applications running as entirely interactive systems. Large organizations split their systems evenly between batch entry and processing, interactive data entry and batch operation, and totally interactive systems. A little more than half the data processing managers indicated that

Figure 7. Computer Investments by Type of Computer by Size of Data Processing Organization

Computer Investments (N=623)	Average Number by Data Processing Size (in FTEs)					Total
	0-2	2-6	6-20	20-100	>100	
Mainframe CPUs in Agency	0	0	0	1	2	1
Stand-alone Minicomputers in Agency	0	1	1	3	3	2
Networked Microcomputers in Agency	0	1	1	5	9	3
Stand-alone Personal Computers in Agency	12	16	42	108	293	74
Networked Personal Computers Out of Agency	3	11	22	86	260	57
All Internal Computers	14	29	66	208	694	150
Mainframe CPUs Outside the Agency	1	1	1	1	1	1

some of their applications were developed through contract arrangements, while only 45 per cent acquired applications from other state agencies, and less than 33 per cent from the federal governments.

Data processing organizations generally have no major role in voice or radio communications, or reprographics and printing services. Electronic mail becomes more important the larger the organization and the more extensive are existing data communications systems. The three most important data processing functions are transaction processing, supporting senior management decision making, and responding to ad hoc data requests. While transaction processing and scheduling became more important with size, providing information for outside use, and responding to evaluations decrease in importance with size.

Clearly the most centralized decisions handled at the state level or by the agency head involved equipment purchases and discretionary purchasing authority. The most decentralized decisions left to the data processing managers dealt with applications. The approval of new applications and the development of priorities on applications development became increasingly decentralized as the data processing organizations became larger.

The most important sources of information in making hardware and software decisions are from those inside the agency while external experts are viewed as the least important. Generally technical staff, end-users, and

technical reviews are the most important sources of information. As data processing organizations get larger, internal technical staff are more important as sources of information. As data processing organizations get smaller, the end-users of the hardware or software become more important.

Net present value analysis is the least often used evaluative criteria for making hardware or software decisions. In hardware decision making, large organizations value vendor quality more than small agencies. Small agencies value the ease of adding on capacity or ease of use. The same holds for software decisions. Small organizations tend to purchase their software off-the-shelf from vendors, while large organizations generate most of their applications themselves, shown in Figure 8.

All organizations, regardless of size, had either formal or informal procedures in place for data storage and access, data transfer to other agencies, use of computer output, systems development, systems operation, physical security, data communications, and contingency plans. Smaller organizations had more informal control while large organizations had more formal controls. Overall, 70 per cent of the states indicated that there was a formal planning process for their agency. These planning groups had a typical planning horizon of between three and four years. States also indicated that these planning efforts did influence agency level budget requests.

Typically, in larger organizations, data processing managers deal with several vendors. The smallest data processing organizations with less than two full time employees still maintained contact with an average of five vendors, while the largest data processing organizations maintained contacts with over 16 vendors during the past year. The two most important vendor services identified were pricing information and the list of products and services provided by the vendor. Generally, large data processing organizations found vendor services to be more important over all than did smaller organizations, reflecting the differences in the technologies they manage — mainframe versus microcomputer-based environments.

According to the data processing managers' responses, generally larger organizations shared information more frequently across their organizational boundaries than did smaller data processing groups. The legislature and the clients were more often provided information, while private businesses and other state agencies were least often provided information. Agencies in related functional areas share information most frequently. Human and social services, closely followed by employment and labor agencies, share more with the federal government than other functional groups. Economic development and commerce agencies share the least with federal agencies. Education and employment agencies tended to share more with clients than other agency groups. Environmental and natural resources agencies share more with private organizations than other functional groupings. Employment and labor agencies also heavily share information with private organizations.

Privacy issues and technical barriers such as compatibility of equipment were the principal barriers to information sharing. Human services and health organizations, and to a lesser extent employment and labor agencies, identified privacy considerations as significantly more important barriers than other functional groups. Data definition problems were identified as greater barriers to information sharing by social services and natural resource agencies than other functional groups.

The number one problem facing data processing managers, regardless of size or technological mix, is access to trained personnel. Adequate budgetary resources is the second ranked problem. The third and fourth ranked problems related to training end-users and adequate documentation for agency users.

#### Agency Program Managers' Perspectives

Program managers overall have a positive attitude about data processing. Transaction processing is viewed as the single most important data processing function. Other functions that are important include the improved ability to respond to outside ad hoc information requests; assist in planning, and assist in analysis. Program managers also indicate that data processing normally meets the program managers' criteria for accuracy, timeliness, and access to data processing. Data processing is seen as having a very important influence on direct service delivery. Small agencies were more likely to see computers influencing program policy than large agencies, but large organizations saw more value for computers in managing facilities and institutions.

Figure 8. Software Development Process by Source of Software by Size of Data Processing Organization

FTEs in Data Processing Organization	Average Percent of Software Developed				
	In-House (N=516)	Off-the-Shelf From Vendors (N=534)	From Another Agency/State (N=251)	From Federal Government (N=182)	Contracted Program (N=316)
From 0 to 2 FTEs	29.4	75.2	32.4	7.4	25.0
From 2 to 6 FTEs	45.1	47.7	18.6	7.2	29.5
From 6 to 20 FTEs	60.0	34.6	10.0	6.0	20.8
From 20 to 100 FTEs	68.1	22.1	11.2	5.7	12.5
More than 100 FTEs	59.9	27.5	7.3	3.1	14.5
TOTAL	57.0	38.5	13.9	5.7	20.4

Almost 60 percent of the program officials identified a specific data processing organization as having responsibility for data processing and data communications; 25 percent identified a general administrative organization. Most have a group responsible for voice communications and a little more than half had a group responsible for radio communications. Voice and radio communications tend to be placed in a general administrative unit with "other" as the next most likely type of organization. The "other" category most likely reflects a specific communications group. Radio communications is much more specialized and the specific functional areas of public safety and transportation agencies clearly make more use of radio technology than others.

Almost all have a unit responsible for office systems, typically a general administrative organization or a data processing unit. Almost all have a unit assigned responsibility for publications, typically, a general administration group or an "other" group. Library services were one of the least likely information management areas to be identified by program officials; over 23 percent indicated "none". Typically, libraries were under a general administrative unit or run as independent organizations (35 percent). Over three-quarters have an information locator services function operating in either a general

administrative or "other" unit. Over 90 percent incorporated a research and statistical analysis function, generally in the "other" category or general administrative unit. The public information function existed in over 90 percent of the program agencies with half in general administrative groups and 40 percent in the "other" category.

Each respondent indicated the extent to which the organization shared information with eight different groups, including the state legislature, other agencies in their functional area, other state agencies not in their functional area, local governments, the media, the federal government, private businesses, and clients. Figure 9 shows the results, with a rank of "1" meaning very often information is shared and "5" meaning never.

Program agencies most frequently shared data with clients of the program agency and the state legislature. The least sharing occurred with other state agencies not in the same functional area and private businesses. Employment services and commerce and regulatory agencies tended to share the least, while education tended to share the most. Generally, employment and labor agencies as well as commerce, regulatory and economic development programs shared more information (rela-

Figure 9. Frequency of Information Sharing to Other Groups

1 - VERY OFTEN TO 5 - NEVER

Major Function Codes	State	Other St	Other St	Local	Media	Federal	Private	Those the
	Legislature	Agencies in your Functional Area	Agencies not in your Functional Area	Governments				Agency Serves Directly
	Mean (N=1603)	Mean (N=1598)	Mean (N=1600)	Mean (N=1599)	Mean (N=1603)	Mean (N=1603)	Mean (N=1585)	Mean (1533)
Commerce, Regulation and Economic Development	1.88	2.28	3.23	3.00	2.28	2.89	2.26	1.57
Education	1.40	1.89	2.84	2.79	1.86	2.21	3.13	1.43
Employment and Labor	2.07	2.34	3.13	3.04	2.67	2.39	2.45	1.67
Environment and Natural Resources	1.77	1.80	3.04	2.42	2.22	1.92	2.55	1.64
Health	1.67	1.79	2.89	2.50	2.40	1.97	2.95	1.75
Human and Social Services	1.72	1.85	2.90	2.49	2.38	1.81	2.91	1.71
Safety and Criminal Justice	1.83	1.89	2.83	2.26	2.21	2.12	3.39	1.92
Transportation and Utilities	1.77	2.18	3.00	2.25	2.10	2.04	2.61	1.86
TOTAL	1.79	2.00	3.00	2.54	2.27	2.14	2.76	1.69

Figure 10. Barriers to Information Sharing

1 - STRONGLY DISAGREE TO 7 - STRONGLY AGREE

Major Function Codes	High Cost of Providing the Information	Lack of Authority to Provide Reqs Info	Personal Privacy Require- ments	Loss of Data Integrity If Shared	Technical Barriers	Problems with Data Definition
	Mean (N=1564)	Mean (N=1561)	Mean (N=1561)	Mean (N=1559)	Mean (M=1555)	Mean (N=1545)
Commerce, Regulation and Economic Development	4.07	3.47	4.16	3.20	4.21	3.99
Education	4.19	2.60	4.02	2.92	4.32	4.50
Employment and Labor	3.95	3.63	4.92	3.13	4.02	4.21
Environment and Natural Resources	3.99	2.84	3.38	2.94	4.32	4.13
Health	3.75	3.28	5.06	3.03	4.24	4.49
Human and Social Services	3.92	3.42	4.79	3.02	4.20	4.31
Safety and Criminal Justice	3.91	3.51	4.77	3.21	4.18	4.15
Transportation and Utilities	4.04	3.32	3.63	3.15	4.38	4.41
TOTAL	3.97	3.28	4.26	3.08	4.24	4.22

tive to other programmatic groups) with clients and private business. Education programs most frequently shared information with state legislatures. Education also tended to share with the media more and local government less than the average for those groups. The human and social services agencies share information most with the federal government, while the economic and employment agencies share the least.

For state legislatures, the principal reason for program agency communication is routine budget requests (48 percent) and routine oversight (22 percent). Agencies in the same functional area tend to share programmatic information mainly on an ad hoc basis and less so for direct service delivery. Sharing with other agencies was generally ad hoc. Sharing with local government related to ad hoc and less so routine programmatic reasons. Ad hoc reasons dominate why program agencies share information with the media. Sharing information with the federal government tended to be the most varied but also the most obviously associated with function and inter-governmental relations: oversight, followed in order by ad hoc programmatic reasons, ad hoc administrative, and routine programmatic reasons. The primary reasons for information sharing with private businesses and clients are programmatic.

Several questions on the survey asked the extent to which respondents agreed that certain factors acted as barriers to sharing information. The results are shown in Figure 10; a rank of "1" indicated strongly disagree while "7" meant strongly agree.

Overall, personal privacy concerns were identified as the single greatest barrier to information sharing, closely followed by technical barriers such as incompatible equipment, and problems of data definitions. The least significant barriers were possible loss of data integrity and lack of authority to share information.

#### In-Depth Perspectives: Case Studies of Six States

The study also looked at the development of information resources management over time in six states. These states included Florida, Kentucky, Minnesota, New Jersey, South Carolina, and Virginia.

In these states, IRM changes, mainly relating to information technology cost control, preceded the development of the current IRM approach. The experiences of these states highlight major concerns with information management policies, procurement practices, information processing systems, personnel, effective and consistent

planning for information technology and information needs, accountability for the use and evaluation of information resources, management structures to promote information sharing, and integrated systems for data sharing among various agencies.

Across the case study states, developing an IRM approach centered on planning and policy processes takes several years. The initial steps generally resulted from findings of deficiencies either in the context of executive reform initiatives or legislative branch reviews. From there, the states typically had to develop organizational structures, define mission statements, develop planning and policy goals and processes, perhaps formally adopt IRM concepts or principles and craft an information or information resources architecture, secure agency plans, and set statewide strategies. The first priority for statewide and agency action was the planning process with management functions such as policy development and control coming later. While service functions were maintained throughout the period, stronger emphasis on serving agency clients developed.

The timelines of IRM adoption in the case study states plus other research indicate that there are several implementation steps for IRM adoption. These are shown in Figure 11.

The central state office organizations have changed considerably over the past several years, most notably because of the creation of high level structures and the reorganizations of central state office responsibilities. The new organizations are under considerable pressure from the legislature, executive branch elected leaders, and agency heads to provide immediate results even when a long term commitment is needed to define and implement IRM strategies.

Service versus control is a major issue in the case study states. Agencies want training and support services but considerable discretion in planning and policy. Most of the case study states have separated policy and planning functions from operations functions and redefined their service role. Those who operate data centers for all or part of the state are under pressure to reduce information processing and/or telecommunications charges. Virtually all have no separate line item in the budget for their operations and must recoup costs through chargeback arrangements.

Planning processes have been major initiatives in the six states. While the planning emphasis remains on the building of technological infrastructures, information management activities comprise a significant portion of state plans. The technological infrastructure initiatives are major — dealing with building statewide telecommunications networks, strengthening organizational structures, building systems that will meet complex information needs across a variety of organizations, and addressing technical and user personnel issues.

The positives of the planning process tend to be related to outcomes of the process: defining information needs, facilitating agency action, and defining statewide issues. Problems areas included finding resources to support the process, supporting statewide and agency specific priorities, the results expected in the budget process from the plans, and the effort versus the relatively small amount of executive branch expenditures involved.

One difficulty is convincing top managers of how information technology applications can provide mission support. Many of the agency information resources officials do not believe they have the visibility and access to top agency executives necessary to involve them and earn their commitment. Many of the agency heads are politically appointed or elected and are responsible for very specific program areas; there is reluctance to take statewide, cross-cutting actions.

There is a general lack of strong coordination between other information management organizations and the central state offices in overseeing IRM. The main involvement that central state office and agency officials have with other information management offices is in the records management area. Problems appear to be the perception that the central state office is focused on information technology, the other organizations' narrow definition of their role and impact, the lack of a structure for their involvement, and misconceptions on both sides about what each other's goals are.

A common finding across the case study states is the impact of IRM leaders who support the management concepts and principles and work to institutionalize them. All have worked to obtain top state management support. A facilitative management style has been critical as well.

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**Figure 11. IRM Implementation Steps**


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**Step 1: DEFINING THE GOAL AND CLIMATE FOR CHANGE**

- Identify current information resources in place and anticipate future needs.
- Assess organizational factors such as current information resources management structure(s) and policies, senior and line management attention, external pressure, how the organization has previously adopted revised management approaches and technology, information resources management expertise, and major information system administrative and program applications.

**Step 2: DEFINE AND IMPLEMENT INFORMATION RESOURCES MANAGEMENT STRUCTURE**

- Develop a basic charter and strategic plan for the agency in adopting IRM, including the definition of IRM principles to guide future efforts.
- Determine broad organizational responsibilities for central and user organizations.
- Define general accountabilities similar to other resources.
- Realign the central organizational framework to identify and integrate responsibilities for IRM in the agency.
  - Define basic functions of the central IRM organization.
  - Reshape old units into IRM functions (may be done in a staged manner).
  - Adjust staffing requirements as needed.
- Establish steering and advisory committees for policy, planning, control, and information technology services.
- Integrate or coordinate the IRM functional units so integrated planning, management, and operational support services occur.
- Identify positions at the division and agency subunit levels to serve as direct managers or coordinators of IRM efforts and define their responsibilities.

**Step 3: DEVELOP THE IRM MANAGEMENT FOUNDATION**

- Develop strategic goals for information resources development and use.
  - Develop IRM functional units mission statements, including service delivery structures and responsibilities to meet these goals.
  - Define planning processes within the strategic directions and implement them.
    - Set organization-wide planning directions and
    - Require divisions and agency subunits to s
    - Identify organizational-wide issues for mai
- luative criteria for reviewing information resources plans.  
 formation resources plans.  
 nt attention; take action on division and agency subunit  
 plans.

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**Figure 11. IRM Implementation Steps - continued from previous page**


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- Define policy development process and implement.
  - Identify policy areas requiring organization-wide attention such as hardware and software standards, data administration requirements, and risk management needs.
- Define information resources architecture to guide state and agency integrated efforts.

#### Step 4: INTEGRATE WITH OTHER MANAGEMENT PROCESSES

- Establish direct linkages between IRM planning, the budget process, and procurement.
- Integrate IRM planning with other organizational planning processes.
- Establish IRM performance criteria for planning, policy development, service delivery, and other critical information management areas.

#### Step 5. EXTEND THE INFORMATION MANAGEMENT PROCESS TO THE END-USER

- Develop organization-wide information resources policies.
- Fully develop IRM organizational framework to the level of divisions and agency subunits.
- Develop end user support tools in using information technology and addressing information management needs.
- Focus IRM strategy on the actual use and value of information in enhancing decision making and service delivery effectiveness and efficiency.
  - Create mechanisms to identify and capitalize on opportunities for information resource sharing, data exchange, and productivity improvement; this includes information resources research and development.
  - Promote transfer of innovative approaches.

#### Step 6. CONTINUALLY ASSESS IRM STRATEGIES AND APPROACHES

- Periodically reassess mission statements, organizational structure, planning and policy development processes, integration with other management processes, and overall strategic goals to ensure these evolve as organizational and end user needs change.
- 

Central government and agency officials continue to work through centralization, decentralization, and distributed processing decisions. Office systems are important as many see integrated personal computers, mini-computers, and the mainframe as the next stage in their states, using the latest office technology. An ongoing concern will be maintaining IRM plans and integrating them across the agencies for statewide action. Executive branch and legislative decision makers will continue to be courted for their on-going support. All of the case

study states are working on personnel issues, these include classification efforts for those in the central state offices and in the agencies involved in the multitude of information and information technology management areas. Recruitment and pay do not seem to be thorny issues in the case study states; classification battles are.

State offices continue to deal with telecommunications deregulation, a multi-vendor environment, emerging technologies, lack of consistent standards, increasing

application demands, and multi-functional initiatives. States are moving from technology issues to information management issues such as data definitions and forging common linkages for information sharing.

### Observations About State IRM Initiatives

The findings of the study reveal a great deal of management change in the past several years. From our standpoint, many of the changes are very positive; in other areas, much work will be needed in the 1990s.

### Major Accomplishments

On the positive side, states have made major accomplishments in information resources management reform, highlighted below. They are particularly noteworthy when one considers how difficult it is to change management structures and basic management processes in government.

- IRM development appears to be most often characterized by cooperative efforts between the executive branch (Governor's Office, information technology/information management group, and agencies) and the legislature.
- Most IRM efforts are built around a set of policy directions or strategic directions that provide a rationale for contributions of information resources to state government. Statewide information technology architectures are another considerable outcome of IRM efforts.
- States are defining planning processes. While the planning processes might be too detailed and burdensome at present, they are being adjusted as planning experience grows. Perhaps more importantly, state and agency officials see the planning process as beneficial in defining needs for the budget process and statewide initiatives.
- Planning is being closely tied to budgeting and procurement, at least at within the executive branch. While more work certainly must be done with legislative decision makers, typically there no longer is a "disconnect" between these major management processes. State IRM officials are getting the message across that it is not the percentage of an agency's budget that IRM entails, but what information resources mean to state government operations that is the central concern.
- States are considering data processing, data communications, and voice communications as part of a comprehensive management philosophy. To a lesser extent, office systems is also being considered. Video and radio communications remain functionally specific at present. As these technologies find a wider state agency constituency we expect they will be incorporated in coordination initiatives in state government.
- IRM managers in the central state offices can build a wide base of constituent support across the legislative and executive branches through advisory and decision making group involvement. Some of these groups involve private business and local governments as well.
- Most states have completed automating major state administrative systems. Considerable work is now being done at the agency level to automate service delivery processes. Central state offices' redefinition of information technology service functions, particularly for smaller agencies, will hopefully speed that along. Agency managers see data processing and telecommunications as very positive factors in service delivery.
- Major telecommunications networks will soon be operational across the states that have tremendous implications for service delivery effectiveness and efficiency.
- States are working hard to identify and adopt new information technologies with direct service delivery, regulation, and decision making applications. For the state level officials, the top ranked information technologies facilitate communication, data access, data processing, and document processing and handling. The agency data processing and program managers tend to be most interested in new technologies aimed at solving specific end-user and output problems. These include portable personal computers, facsimile, desktop publishing, and laser printing.
- States are encouraging shared information and shared systems, most notably in functional applications areas such as social services.
- States are recognizing that many computing environments are possible and advantageous for state operations. Moreover, there is evidence that central state offices are decentralizing operations!

control over computing resource applications at the agency level. The central role appears to be control in areas such as standards that have a state-wide operational impact, particularly for information exchange and communications for service delivery and administrative systems.

- While procurement remains a problem area for most of the states, it is apparent that procurement reform is a high priority for most IRM offices. Actions such as developing computerized procurement inventories and using the purchasing power of the state are signs of major progress.

### Issues for the 1990s

There are also several areas that states should put on their future IRM agenda. For the most part, the following areas present difficult issues that will require major management efforts.

- Accounting codes are inadequate to capture a basic level of management information on IRM expenditures. Expenditures in IRM areas continue to show sizeable increases and states must be able to monitor these expenditures well.
- While states have expended increasing amounts on information technologies, states identify budgetary constraints as a barrier. More work will be needed documenting and justifying to elected officials the long term productivity and service delivery payoffs of information technology applications.
- Information locators are not well developed in the states as a basis for information sharing.
- Knowledge of computing resources at the agency level which is not mainframe-oriented appears to be deficient. This is particularly true of small agencies.
- Office systems have received little attention at the central state office level; agencies indicated office systems are major technologies for them. It is unclear if lack of central state office attention is problematic, but bears watching.
- Much work remains to be done on IRM job classifications and pay grades.

- Records and archives management continues to suffer a lack of management attention. The progress of electronic recordkeeping, a necessity for effective and efficient operations, will likely depend on how well records management efforts are upgraded and supported.
- Only a few states have tackled information management head-on in developing data dictionaries and providing resources for strong data administration.

We expect that future progress for IRM will involve the consideration of management solutions for these very thorny issues as states build on their major accomplishments from the 1980s.

### Summary: New Directions

We found IRM is a new management function building a foundation across the states. It is not happening all at once, but in measured steps befitting management reform. IRM efforts are crafting a management philosophy that fits the complex diversity found in central state and agency administrative and program offices, and information resources management areas such as data processing, telecommunications, office systems, records management, and library services. We found that state government IRM is not considered a technique; it is a new management function that is slowly maturing and defining concepts, structure, processes, and skills. Its goal is to manage information and information technologies in support of the organization, forging ties and linkages to other management and political processes.

Information resources management executives and professionals in state agencies and central government offices alike must work cooperatively and energetically to achieve the payoffs from the investments in information resources that elected officials and senior government executives expect. At the same time, legislators, governors, and senior executives in state government must increasingly learn that effective and efficient management will require their support, their commitment to constructive management and technical change in state government, and, most importantly, their sensitivity to the cultural, political, and public service values which must guide IRM initiatives.

# INFORMATION RESOURCES MANAGEMENT PROCESS

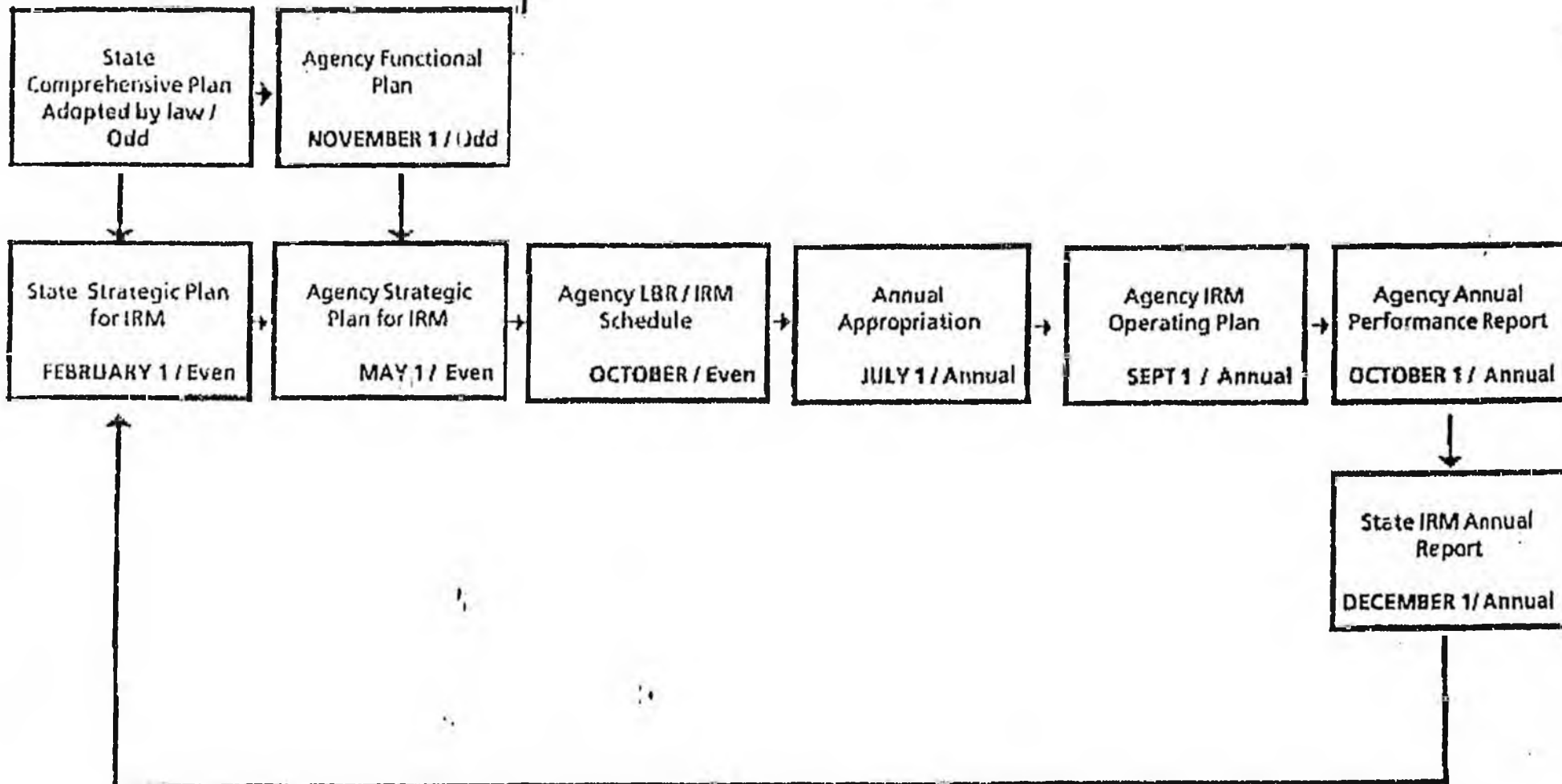


FIGURE 1

# Policies for the Electronic Information Age

Now that computers have taken over, states need to update the rules for managing their information resources.

Edwin Levine

**I**nformation — the lifeblood of government — is getting more complicated to manage.

Like everyone else, states have become totally dependent on computers and software, networks and telephones, for stor-

ing, sorting and providing access to their information. Managing this electronic data and the technological structure that supports it will become the challenge of the 90s.

Statutes dealing with government information and the public's right to know have become outdated. Lawmakers are finding themselves embroiled in complex debates over information dissemination

and the costs of access to computerized government information, copyright, computer security, optical storage and computer privacy.

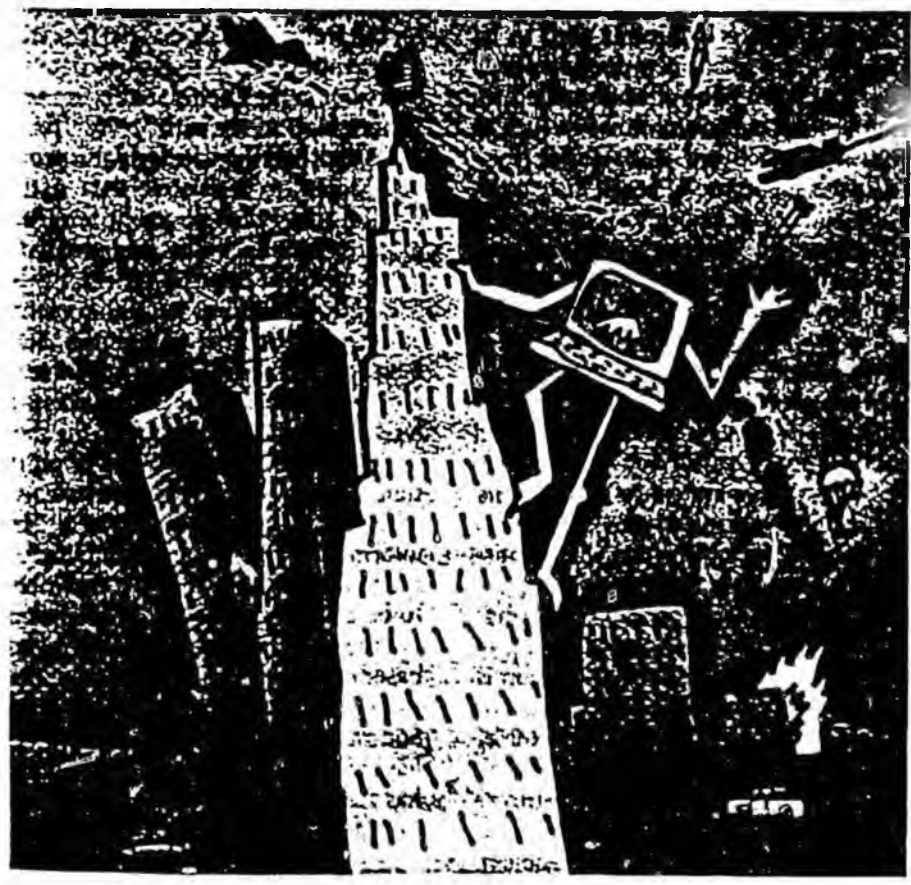
The need for redefinition is based on the increased value of the information being produced, created and stored by government today. It was valuable as "marks on paper," but the costs of finding, sorting, combining and analyzing paper files were prohibitively high. Computerizing the information has reduced costs, improved the ease of use and provided capabilities for information management that were impractical with paper records.

Today it is possible to use technology to manage information, rather than having to manage the technology itself. For state legislatures this is a critical distinction. If we separate the information from the technology that stores and processes it, the underlying policy issues are much clearer. These issues are the meat and potatoes of state legislatures: How will scarce resources be allocated? What are the equity concerns? What is the public interest?

Information is an asset. But does the information belong to the individual who provided it to the motor vehicle registration bureau? Or to the bureau, which wants to sell it to a company that markets mailing lists? Or is it now "public information," which must be provided to any person who asks for it, including the child support enforcement unit that wants to find recalcitrant parents?

Legislative responses to these questions are eclectic. Some states restrict the release of "personally identifiable information," while others limit only distribution of "confidential" information. At the federal level, Congress passed the Computer Matching and Privacy Protection

Edwin Levine is staff director of the Florida Legislature's Joint Committee on Information Technology Resources.



Act last October. It establishes stringent controls on matching computerized information about individuals.

Studying the problems raised by the growth of computerized government, the Florida Legislature's Joint Committee on Information Technology Resources identified four major groups of issues that lawmakers are going to have to deal with — control of information, its dissemination, its security and its preservation.

1) One of the problems of controlling information is the question of privacy, allowing people to know what personal information is being collected about them, why it was collected, where it came from, how it will be used, who has access to it. The common concern is the individual's lack of control over information about himself once it is computerized.

2) The second set of issues raises fundamental questions about government's responsibility for providing access to public information. It brings up such questions as whether government can copyright its information, whether software written by government employees should be sold, who should be allowed and who prevented from disseminating government information, whether government will provide only what the private sector won't, whether information will be available to everyone or only to those with a computer, whether it's fair to provide a computer printout to some and a diskette or tape to others.

The debate over who will profit from the use of information is fierce. Many public agencies would like to offset the tax burden with profits from their investment, but should taxpayers have to pay again for what they have already funded? Minnesota allows its counties to copyright and sell their software. Is it in the public interest to have government compete with private business? Should private software companies be taxed if the receipts are to be used to fund the marketing of software developed by public employees?

Is it fair for government to charge for the examination of its actions? Is it appropriate to require that examination of the public record be based on fees or the ability to pay, or should citizens have free access to this material?

The third and fourth sets of issues that legislatures must address are those of security and preservation. Security is vital to ensure that data is neither altered nor destroyed and that confidential information is not released. Other security issues have to do with disaster recovery, access controls, security plans and protection of functions such as electronic voting systems where the integrity of the process must receive extraordinary attention.

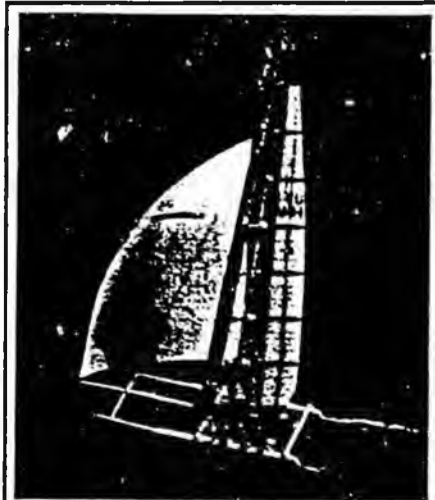
4) Preservation problems have to do with saving and managing public records that are stored on non-paper media such as magnetic tape or optical disk. Questions that have to be answered include what is the status of non-paper records as evidence, whether a document is a copy or "the" original, how to manage access and destruction of computer records and the software used to search them, and how to determine what records to preserve given the glut of useless information that can now be cheaply stored electronically. Then there is new technology such as electronic mail that never creates a paper document at all.

These issues have already created difficulties for legislatures. In Texas an optical storage law has been challenged because it allowed for the destruction of "the original" paper records and authorized the use of technology for which there are no national standards.

New York has completed a plan to manage and preserve electronic records. The Uniform Commercial Code is being reviewed to determine how electronic records will affect current law.

State legislatures have dealt with broad societal changes in the past, but the information age is speeding toward us a lot faster than anything we've ever dealt with before. The adoption of information technology may be virtually complete by the turn of the century. Will lawmakers have enough time to determine the public interest in these issues?

The treatment of government's own information will be most troublesome. Who will control this information, who will disseminate it, how will it be secured and how will it be preserved? The information age will force every legislature to re-examine old and settled issues from a new perspective.



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# THE NEW CIO

Kentucky Department of Information Systems

## Statewide Goal: General Purpose Info Bank

The Kentucky Information Systems Commission was created in 1984 to coordinate statewide strategic planning for computerized information systems. As chairman of the commission and commissioner of the Department of Information Systems, Stephen N. Dooley ensures information is planned for and managed.

By Lea Brooks  
Associate Editor

**B**ulky food stamp policy manuals are one target of Kentucky state government's effort to build an online "locator" system that will electronically disseminate frequently used information to government employees and citizens.

"We feel we have an obligation to find easy ways to disseminate commonly used information electronically, as opposed to paper passing," explained Stephen N. Dooley, commissioner of the Kentucky Department of Information Systems (DIS) and chairman of the Information Systems Commission.

"We're looking for a way to present information in an easily used format for people — information that changes frequently and is frequently referenced. We're doing a lot of pilots with different tools for that purpose."

One of the pilots involves food stamp policy manuals used by caseworkers. Two of Kentucky's 120 counties are participating in the development of an electronic manual that can be easily accessed and updated.

Dooley said he also wants to build a general purpose information bank where the public can find out how to do business with state government; the status on bids; and "general information on how state government operates: the players and organizations — types of things you can find out but it's often in two or three different publications that are outdated after a couple of months."

Dooley is a Kentucky native who left a position with the Federal Reserve Bank of Atlanta in 1977 to accept a job with the Kentucky Division of Computer Services in Frankfort — the state capital and his home town. Dooley rose through the ranks to the commissioner post in March 1984.

"In government, there is an opportunity to watch projects develop and actually see improvements in things that you've had a hand in," he said. "Sometimes in a corporation, you do not have as great an impact as you do in the government environment. Some things we get involved with impact most every citizen in the state. It's a real challenge being involved with these projects."

Dooley said his biggest satisfaction is "bringing people from different backgrounds, different agencies and different perspectives and getting them to work together, getting a consensus on what to do. Our biggest strength in the department



Photos by David Sierling

is the people. We have just outstanding individuals in both the management and technical perspective. They make my job easy."

### Commissioner Duties

As commissioner, Dooley is responsible for the planning, development and operation of all government information systems within the executive branch. This includes establishing information strategies and policies for state government; development and support of automated systems for mainframes, departmental systems and microcomputers; and management of the Commonwealth Data Center and its statewide network.

Dooley, who reports to the Finance and Administration Cabinet secretary and serves at the pleasure of the governor, works closely with cabinet and agency management, the governor's budget and administration staff, and the Legislature.

The DIS, which employs 405 people and has an annual budget of \$27 million, has six divisions: Data Management; Information Resources Management; Operations; Special Projects; Systems Engineering; and Systems Support. Kentucky spent an estimated \$65 million on information technology in fiscal 1987-88, excluding higher education.

The department also provides staff to the commission, an independent agency of

state government charged with coordinating the statewide strategic planning for computerized information systems. The commission published the commonwealth's first strategic plan in December 1987 and the Kentucky Information Resources Architecture in conjunction with the planning process.

By law, the DIS commissioner is a member of the 16-member commission, which is comprised of representatives from state and local government and the general public. Dooley was elected to the chairmanship by the other commissioners.

"My overall function (at DIS) primarily is to provide direction to our different divisions," he said. "I work with the directors to set the overall direction and overall goals. I also make sure they have the resources and skills they need to accomplish their responsibilities."

"We're primarily a service agency. At the same time, our role is to provide leadership and direction through architecture. We try to dovetail those two things. We're dealing with numerous agencies, each one with its own set of priorities. We're trying to help them."

"The commission is the planning body — I'm just a member. They do the architecture. They have a lot to do with overall directions, strategies, and emphasizing or promoting things in state government."

The DIS "always keeps planning in mind while emphasizing services — they go hand in hand. I think there is a definite benefit of having a commission and a department at our level," he said. "It allows us to emphasize and give examples where technology has offered a solution. It gives visibility, especially when competing with other priorities."

"It's worked out this way for Kentucky. I'm not sure it would work in every situation. It takes a lot of work to make it work."

### Negative Feelings Overcome

The evolution of information technology in Kentucky state government "has been a hard road," according to Dooley.

One of the biggest obstacles has been overcoming agencies' "negative feelings" stemming from the state's centralization and consolidation of computer services, he said. Computer operations were merged under one roof in 1973; applications development functions were combined in a separate department in early 1981.

The two functions were merged in late

"We feel we have an obligation to find easy ways to disseminate commonly used information electronically."

The New CIO continued from page 33

1981 to create the Department of Information Systems.

When services were initially consolidated, the agencies were told, "(Technology-related) people on your staff are now with a new department and that department will charge you to use those services," Dooley said. "I can certainly understand the negative feelings — agencies are now paying an hourly rate to the people they used to have on their staffs. . . and they have no control.

"When I took over, the perception of our department was not real good among agencies. We could not do the things we felt we needed to accomplish if we were not on good terms with our customers."

Under Dooley, the DIS has focused on customer service to smooth over the hard feelings. "The only reason this department is here is to serve the other agencies," he said. "If we're not doing that, we're not doing our job. We've changed the job from strictly a control environment to a service environment. It has taken a lot of effort to try to be responsive instead of an impediment for an agency to get something done."

The rapid change in the marketplace triggered by the microcomputer presents another challenge. "Traditionally, we have been highly centralized, mainframe-oriented," Dooley said. "We're trying to



*"We're trying to emphasize that there are multiple solutions — let's get the right fit for the right reasons."*

*"We want our agencies to be able to take advantage of all things out there."*



Photos by David Sterling

*"We're trying to find that medium-point between highly centralized and decentralized."*

find that medium-point between highly centralized and decentralized.

"We have really tried to encourage people to use microcomputers — we consider departmental systems appropriate. We're trying to emphasize that there are multiple solutions — let's get the right fit for the right reasons. We're trying to get our professional people to look at it that way and support that solution.

"We're not downplaying the importance of the Data Center," he emphasized. "Certainly, small systems offer significant opportunities for improvement in state

operations. We want our agencies to be able to take advantage of all things out there."

#### Strategic Planning Emphasized

Information resources planning was consolidated through creation of the Kentucky Information Systems Commission by the 1984 General Assembly.

"The Legislature didn't know what was going on in information systems," Dooley said. "I think there has not been a great relationship between this department and the legislators. There was concern about some of the activities going on. The commission was the Legislature's answer to that."

There was a lot of "wheel spinning" during the commission's first year, according to Dooley. "We felt that if we were going to make the commission of value, we needed a focus and more defined charter."

Rather than getting involved in day-to-day activities, commissioners wanted to concentrate on long-term planning and strategy. They recommended that the orig-

inal legislation be amended to emphasize strategic planning.

The 1986 General Assembly directed the commission to establish and coordinate a statewide strategic planning process for automated systems in the three branches of state government and the constitutional offices.

The first biennial planning process was developed based upon the following premises:

- Government information is a valuable resource which has been entrusted to public officials and should be managed as such.
- The value of the state's information lies in its application. Information should be created or collected only to the extent that it has practical use in fulfilling the agency's mission.
- The public has right of access to governmental information, but that rights of access must be balanced by the individual's right to privacy.
- Agencies should identify their information needs and document how automated information systems fulfill those needs. To avoid duplication and maximize efficiency, agencies should consider obtaining information from existing sources or taking advantage of existing systems before spending funds to create entirely new ones.
- A primary procurement consideration should be compatibility with existing systems. This includes interconnectivity of processing devices as well as selection of software which facilitates data exchange within the agency or between agencies.
- Agencies must manage their records as an ongoing process.
- Managers are to be responsible for assuring that information within a system is protected and that controls are in place which assure that information within the system is being collected and used appropriately.
- Information resources are to be managed for the benefit of the commonwealth as a whole and the public at large.

Each agency is required to submit an

### Stephen N. Dooley

AGE: 37

BIRTHPLACE: Louisville, Ky.

EDUCATION: Earned a bachelor's in industrial management from the Georgia Institute of Technology in Atlanta in 1973 and a master of decision science from Georgia State University in Atlanta in 1976.

CAREER: From 1973-75, worked at the Miami branch of the Federal Reserve Bank of Atlanta, initially as an associate systems analyst and later as a systems analyst. From 1975-77, was initially a planning analyst and later a com-

munications department manager for the Federal Reserve Bank of Atlanta. From 1977-80, was branch manager of traffic control for the Kentucky Division of Computer Services; from 1980-81, he was assistant director of telecommunications for the division. From 1981-84, was director of the Kentucky Division of Information Systems' Division of Systems Support.

PERSONAL: Lives in Frankfort with his wife, Cheryl, and sons, Andrew, 12, and Bradford, 8. Enjoys water skiing, playing softball and other sports, and attending his sons' soccer games. ■

## Kentucky Technology Applications

The following are a few of the information technology applications in Kentucky state government:

- The Kentucky Automated Management and Eligibility System (KAMES) determines eligibility for food stamps and is being expanded to other assistance programs, including Families with Dependent Children and Medicaid.

When the integrated system is implemented, the commonwealth will have one statewide system that supports the administration of all assistance programs.

"We implemented a system where each caseworker in the field in 120 counties does online interviews with their clients," Department of Information Systems (DIS) Commissioner Stephen N. Dooley said. "They input information as they go through the interview — a questionnaire-type deal."

If a caseworker has all the information, he or she determines on the spot whether the client is eligible for benefits. If more information is needed, the system automatically schedules another meeting with the client.

- The Data Dictionary contains information about computer systems residing on the state's mainframe computers. "It's an information repository that tells you what systems do what," Dooley explained.

- The Department of Information Systems, the Department of Education and IBM jointly developed and funded Project Vision, a computerized math skill presenter for first and second grades that combines interactive videodisk technology with a computer touch screen. It allows a student to work on the computer without a keyboard. The software reinforces concepts introduced by teachers in the classroom.

- In 1973, the Kentucky Board of Elections implemented the first automated voter registration system. In 1986, a statewide version of voter registration, which provides county clerks online capability for maintenance of voter registration records, was implemented.

A vote tally system has been developed so county clerks can report election results to the state for federal and state offices.

- Kentucky is installing a statewide purchasing system that will be available to all agencies. "The purchasing system up to this point is primarily a manual process that involves lots of paper," Dooley said. "This, we think, will certainly assist in streamlining the process and getting a better handle on the types of information our people need to do effective purchasing."

- The DIS has formed a task force to develop standards and procedures that will enable geographic information system (GIS) resources to be shared across the Kentucky Statewide Network.

- The DIS is also looking at the feasibility of putting together an executive information system for financial management. ■

See The New CIO, page 38

The New CIO continued from page 34

Information Resources Plan to the commission, which makes recommendations to the governor's office and the General Assembly for use in preparing the biennial budget.

"We review them not so much on dollars spent but rather, is it reasonable?" Dooley said. "Does it have statewide potential? Should we support it? Does it relate to the overall business mission? Is it consistent with the architecture?"

During the first planning cycle in fiscal 1988-90, some agencies were hesitant about preparing the plans.

"Once they got into it, they found it was beneficial to involve their people in information technology," he said. "The first time was the hardest. Some things that didn't work have been revised. Planning is a process — not a project. You keep refining it."

Dooley said the DIS's relationship with the Legislature "has been very good since

the commission began focusing on the planning process. They (legislators) feel more comfortable having a group looking at what agencies are doing with information technology — someone with a background in information technology who can raise red flags if they need to be raised."

A four-member legislative subcommittee on information systems has been created. "We have made a strong effort to develop a good link with them. They oversee the review activity of the commission and my department. We've tried to develop a good relationship with them," he said.

**Information Resources Architecture**

The Information Resources Architecture is a framework of standards, guide-

lines and directional statements related to information resources management in the commonwealth.

The architecture was designed to promote and facilitate information and resource management across organizational and geographic boundaries. It provides guidance for planners, standards for implementation and a framework for resource sharing.

In the past, DIS's planning efforts dealt mainly with technology. With the adoption of the architecture, DIS is taking a broader view of information systems to consider the information itself as an asset which must also be planned for and managed.

The architecture is divided into three broad categories — technology, information and the organization — and three

levels of information management — state-level, departmental and desktop.

**Applying Ideas**

Dooley noted that the DIS "is covering twice as much area" despite a reduction in its staff by some 25 employees since its inception. "We've come a long way," he said. "Our people can feel good about themselves having been able to accomplish all that they have with virtually the same level of resources. I think that's a credit to them."

"We try to act upon other people's ideas as well as our own," Dooley said. "If someone has a good idea, let's see if we can implement and put it to use. We want to be able to recognize a good idea or a possibility and put parties and resources together to apply technology to that issue." ■

**Rochester P.D. To Mug With Still VHS**

**ROCHESTER, N.Y.** — Two local area law enforcement agencies are exploring applications of electronic photography to identify and record images of arrested suspects with still video equipment.

Agents from the local FBI office and the Rochester Police Department recently used Kodak still video equipment to obtain hard copy prints of suspected criminals from surveillance video tapes.

The process uses electronic digital imaging to help convert the video signal to a color or black and white image. Thermal prints are then produced in 4- by 5.2-inch size using a color Kodak video printer.

Banks and convenience stores use VHS-type video systems for surveillance because they are easy to use and cost-efficient. The drawback for police work is the length of time it takes to translate video images to hard copy that can be used by officers. The process generally takes about two weeks, according to Dennis Penna of the Rochester P.D. Crime Analysis Unit.

But Penna said the Police Department is excited about the potential of electronic imaging when combined with same-day production of hard copy prints.

Electronic imaging equipment — designed by Edicon, a Kodak subsidiary in Brighton, N.Y. — is scheduled for installation by the end of the third quarter.

The first application of the new system will not be in conjunction with video surveillance, said Police Chief Gordon Urlacher. The department plans to use the equipment as part of a new computer mug shot system to help speed up the process of having victims identify criminal suspects.

"By comparing many physical categories of suspects, this system will help us narrow down the number of suspects much more quickly and efficiently than flipping through thousands of mug shots," said Urlacher. He added that the videotape surveillance application would be re-examined upon successful implementation of the computer mug shot system. ■

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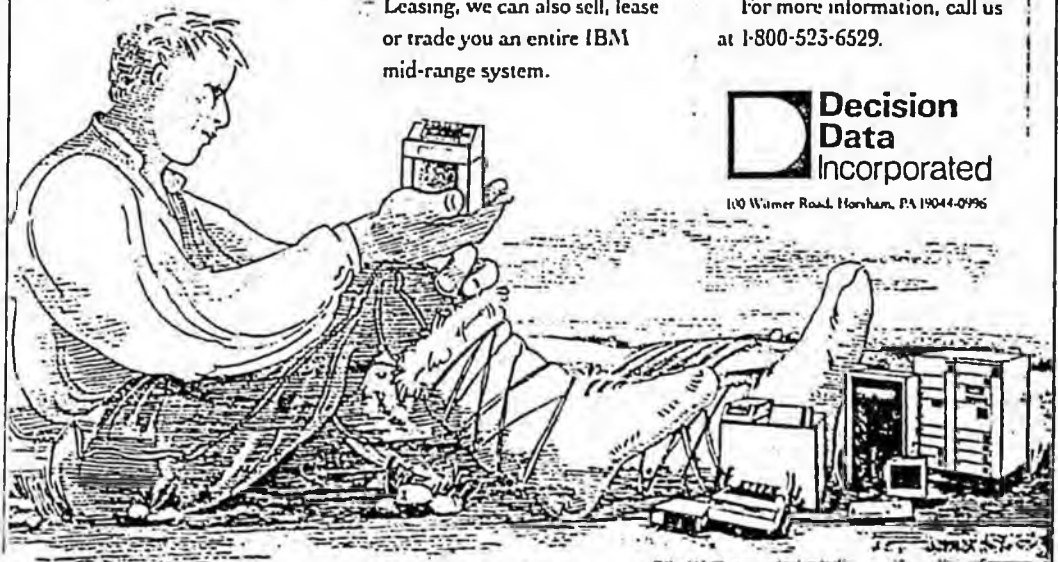
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Item 8

# GOVERNING GUIDE



# MANAGING INFORMATION

# G

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# MANAGING INFORMATION

This GOVERNING Guide is based on a recent study of the ways in which states use technology to manage information. *Managing Information Resources: New Directions in State Government* was prepared by Sharon Caudle, Donald Marchand and three



colleagues at Syracuse University's School of Information Studies. It is the first comprehensive study of state use of information technology.

*Managing Information Resources* examines the tactics being used to channel the rising tide of data in state government. The study, conducted in cooperation with the National Association for State Information Systems, was funded by Bell South, Digital Equipment Corporation, Electronic Data Systems, Bull Worldwide Information Systems, IBM, NCR, NYNEX Busi-

ness Information Systems, Plexus Computers, Prime Computer, Tandem Computers, UNISYS and US WEST Communications. Copies are available for \$50 from the School of Information Studies, Syracuse University, Syracuse, New York 13244.

*By Harrison Donnelly  
Curt Döty Illustrations*



## Transforming Chaos

When experts studied the state of Virginia's use of computers and other forms of technology in the early 1980s, they found a tangled mess. Not only were information services costly and labor intensive, but the responsibility for managing them was divided among three separate state offices. Meanwhile, little was being done to integrate different forms of technology, the purchase of new equipment was a complex process, and planning suffered as a result.

Over the next few years, Virginia state government officials pushed hard to develop systems that would put them back in control of this increasingly important aspect of state operations. Although certain problems persist, today Virginia boasts a number of policies and programs that are dedicated to improving the state's use of both technology and information.

The Old Dominion's efforts to bring order out of technological chaos reflect changes that are reshaping the way state and local governments do business. Keenly aware that the efficient management of information is crucial to their mission, policy makers have adopted a broad array of tactics and strategies designed to improve the way they employ computers, telecommunications, office systems and—above all—the people who oversee them.

The states appear to be succeeding in such efforts beyond expectations. In a report issued by Syracuse University's School of Information Studies in August of 1989, Sharon Caudle and Donald Marchand note that many states are making great strides in streamlining their information-resource management—that is, their control of the acquisition, use, transmission, and storage of information.

The 23 states surveyed are not sim-

ply installing new computers or telecommunications equipment. Rather, they are formulating by trial and error a new management discipline.

The stakes are high. Indeed, ready and reliable information about state programs has become so prized by state policy makers that decisions concerning its management have migrated from the computer room to the board room. Governors, legislators and top agency executives have all grown increasingly dependent on technology for the data they need to make decisions. To meet this demand, Caudle and Marchand believe, the focus of information technology must shift from the technical goals of specialists to the state government's overall mission.

On a scale unimaginable 10 years ago, the new information-management policies are transforming the work process and the nature of service delivery all across the United States. The reason: State governments are data-intensive enterprises. Far more than most industries of comparable size, state governments have a mandate to collect and utilize information, be it about welfare recipients, licensed drivers or schoolchildren.

The effective management of information resources thus promises to increase productivity in the states. "If you are going to improve the quality of state government," asks Marchand,

"where else would you look?" In the future, states will be judged on how well they define their information needs and how well they manage huge masses of information. State and local governments that succeed will prosper; those that do not may lag far behind.

In recent years, several factors have combined to inflate the importance of these issues. The policies of the Reagan administration, for example, shifted responsibility for many social programs onto the states. Simultaneous budget constraints, however, kept the states from hiring more people to cope with their new duties. Not only that, but most states had their hands full trying to assimilate an unprecedented series of technological and regulatory changes in the information field, including the influx of personal computers (PCs) into offices in the early 1980s and the court-ordered breakup of AT&T in 1984.

Despite the reality of budgetary pressures, Caudle and Marchand caution, the goal of information-resource policies is not solely to reduce costs; rather, it is to help states do what they do better. After all, governments are in the business of delivering services, not of saving money. Policy makers should therefore use the information resources at their disposal to deliver services more effectively—in short, to get more bang for the bucks.

## COMING TO TERMS

Throughout their study, Drs. Caudle and Marchand distinguish between two carefully defined concepts. They use the term "**information resources**" to signify everything from information itself to the machines that manipulate it to the manpower and money involved in the process. "**Information technologies**" has a more specific meaning. It denotes computer hardware and software, telecommunications devices that handle voice, data and video messages, and office systems—that is, high-tech tools such as electronic mail, facsimile machines and bar-code scanners that promise to increase worker productivity.

## A MAN AND HIS DATA: STEVE DOOLEY OF KENTUCKY

**F**or Steve Dooley, Kentucky's commissioner of information systems since 1984, improving the state's management of information resources has been the fruit of a simple seed: getting people in state government to talk to one another. "A big part of it is just starting a process of communication," says Dooley, "and getting the key people to think alike."

Dooley seems to fit an archetype defined by Caudle and Marchand—that of the state official who can articulate a vision of where the government needs to go in the field. As Dooley sees his role, a crucial first step on the road to more effective data management is getting people's minds off the narrow topic of equipment and onto the broader question of their information needs and how to meet them. "We've tried to change the way people view information," he explains. The ideal is to consider information as "an asset, rather than just concentrating on what type of computers we have."

A vision such as Dooley's takes time to implement: Kentucky has been working since July 1977 to set up an organizational structure and planning process to better manage its information. That glacial pace notwithstanding, the state has managed to skirt some of the obstacles that other states are now meeting head on.

"A lot depends on the environment," says Dooley. "We've come from a very centralized perspective and have been moving toward a more decentralized environment. But other states have had problems when they've started with a decentralized environment and tried to go in the other direction."

For Kentucky, a key tool in the process has been its

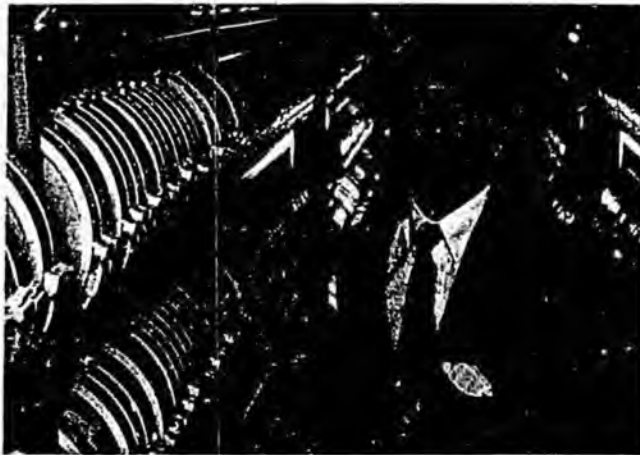
regularly updated "architecture" document, which charts the state's course in information resources. The document spells out standards and policies which government officials then seek to apply.

An advantage of this architecture, Dooley notes, is that it presents the state's overall information-management goals without dictating how they are to be met. "Since users have a road map of the direction the state is going," he says, "the architecture helps make their decisions easier. But it's not a document that says, 'Everyone has to follow this all the way down the line.'"

Kentucky's priority at the moment, says Dooley, is to expand the universe of people who benefit from the state's information resources: "We're working more and more on how to

get information to people—not just to state and local government personnel but also to the public at large." Toward that end, Kentucky officials are in the midst of converting government information now on paper into electronic form. This will make data on, say, state procurement practices more readily available both to state employees and to small firms eager to do business with the state. The frequently changing rules on distribution of food stamps, to cite another example, can be put on-line to keep human resource personnel up to date without constantly consulting massive policy manuals.

As evidence of its dedication to effective information management, Kentucky is extending its efforts to the local level. "By learning who the people are that we need to talk to, and by being more aware of their needs," says Dooley, "we've begun to build bridges with the local governments."



Dooley: Information is an asset; its management involves far more than choosing computers.



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sion already under way. PCs were pouring into offices, and deregulation had made a complex thicket of telecommunications policies that once consisted of nothing more involved than paying the phone bill. To cope with this rising tide of technology, state officials realized, would require a large dose of proactive management—the practice of addressing problems before they arise.

The result has been a textbook experiment in federalism. Each state has found its own way, formulating laws, executive orders and policies designed to manage its information resources more coherently than in the past. Not only have the states' experiences varied widely, but individual agencies within each state have had to customize policies to suit their own particular needs. The use of computers in a corrections department, for example, differs significantly from computer use in a human services agency.

Not that every state is reinventing the disk drive. By sharing information among themselves, many states have adopted ideas and approaches that were first put into practice elsewhere. Still, cooperation can go only so far. No matter how good a borrowed strategy may be, it will not work unless officials tailor it to their own state's culture, politics and governmental structure. Anyone who neglects this fine-tuning of an information-management agenda is likely to experience a discordant period of implementation.

The six states in the case study ran the gamut of organizational models, from centralized (Florida) to decentralized (South Carolina). In each model, the management of information resources has evolved successfully.

For a number of reasons—among them personalities, priorities and resources—other states have not matched the progress of the six test

cases. Louisiana and Mississippi, for example, have been held back by budget problems, while Texas officials cannot agree whether to make changes through a single policy imposed from above or through individual initiative by the state's highly decentralized agencies. Even though several agencies in the state have developed effective policies on their own, Marchand observes, comprehensive changes in a state as loosely organized as Texas will take a long time.

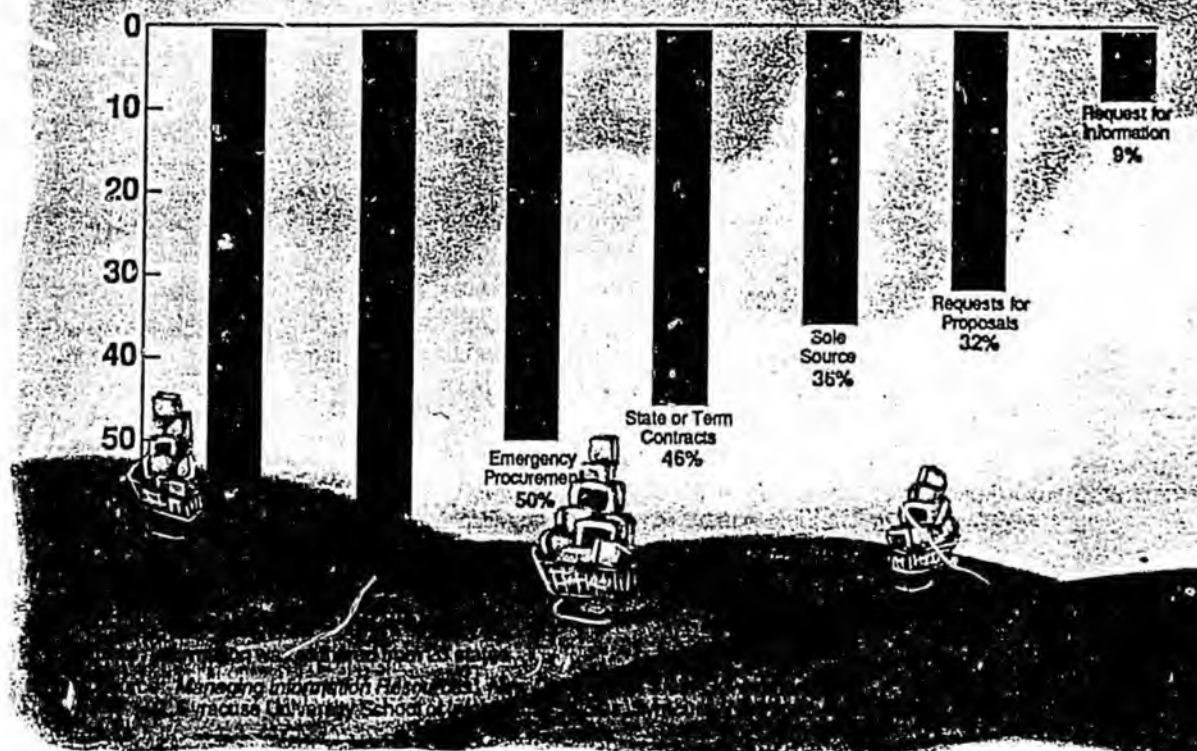
In the test states, meanwhile, progress in managing information resources has been more concrete but no less arduous. A number of distinct steps seem crucial to success. First, state officials must be made aware of any weaknesses in their government's information management. In South Carolina, for example, officials were alerted to this condition by a 1981 report from the University of South Carolina that spotlighted deficiencies in the state's use of telecommunications, data processing and office systems. Next, states must establish an organizational structure for the overall management of information resources. In Florida, a 1983 law created the Information Resource Commission, an oversight committee with a charter to coordinate the state's efforts in years to come. Finally, states must devise a planning process, adopt goals and—as have Kentucky and Minnesota—create an information-management "architecture," or overall framework of standards, policies and guidelines.

All that takes time. Yet state government information managers operate under political pressure to produce quick results. Elected officials seek to make changes during their term in office, but most management functions tend to evolve over a far longer time span; designers of effective information policies follow a long-

(continued on page 18A)

## PROCUREMENT: THE SAVINGS

### Methods of Procurement



Public managers seeking to contain costs may be able to reap substantial savings in the area of information-technology expenditures. State governments' procurement of information technology, says study co-author Donald Marchand, represents "the only area where significant cost savings are possible. Major economies can be achieved by focusing on procurement."

The sums spent on procurement in the past hint at the savings possible in the future. In fiscal year 1989, the report's authors estimate, the 50 state governments shelled out nearly \$20 billion—an average of \$36.50 per capita—for information resources. Purchases of information equipment and related expenses consumed nearly 2 percent of the states' budgets; with salaries factored in,

that average rose to 3.4 percent. New York alone spent \$15.8 million on computer hardware—plus \$4.4 million on software—in FY 1987-1988. Meanwhile, outlays for state governments nationwide continue to grow at an estimated rate of 7 percent each year.

As Caudle and Marchand acknowledge, such estimates are a far cry from hard and fast statistics, and the imprecision shows that the states have only a vague idea of the amounts they are spending on information resources. The culprit: outmoded accounting systems that are either too crude or too complex to accurately track information-technology expenditures. Some states, for example, lump purchases of computers and bulldozers together as capital-equipment costs; others record every purchase in unnecessary detail, frustrating managers

# PLACE



says Marchand. "You can't manage what you don't see."

Marchand and Caudle have pinpointed several procurement policies that contribute to the muddle. Many states have allowed individual agencies to decide what sort of equipment to buy and how much to pay for it, leaving the central state government ill-informed about which computer and communications systems are in place. The result is often a jumble of incompatible technologies. "You can't leave purchasing totally to agencies," says Marchand. "You can't have 70 different types of PCs and five different operating systems that you can't link together."

Many states are striving to become smarter shoppers in the information-technology marketplace. In Kansas, Mississippi and Oklahoma, the state acts as a single con-

sumer where information technology is concerned. This "one-buyer" approach enables the state to take maximum advantage of its considerable marketplace leverage, acquiring the best equipment at the lowest cost. The tactic also promotes the use of standardized, compatible technology, allowing states to follow an economical "hand-me-down" approach in which outdated or outgrown equipment can be passed on to smaller or less automated offices.

In most states, the decision to purchase any type of information technology involves several separate state offices. Usually one office reviews the need and the proposed purchase, a second office approves the purchase and a third office actually makes the purchase. A number of states are experimenting with giving a single information technology office the authority to control all or part of this process. Other states are finding value in adding yet another layer to the process for particularly large purchases. Florida's Information Technology Resource Procurement Advisory Council reviews all information resources acquisitions that cost more than half a million dollars over a two-year period.

Another approach is to encourage competitive bids before awarding a contract. Still another is to establish tough ethics codes that prevent conflicts of interest in purchasing. South Carolina, for example, has adopted special guidelines governing the procurement of information technology. These rules ban the unauthorized release of proposed procurement needs, informal contacts between responsible government officials and vendors, and the tailoring of specifications to a vendor's products. Just knowing what the state owns and keeping track of it can improve procurement notably. Nine states in the study have installed or will soon install computerized inventory systems to keep tabs on all purchases. New Jersey's system, on-line since 1986, provides users immediate access to the inventory of hardware and software maintained by the state telecommunications and information systems office—what it is, where it is, what it cost, how old it is, and who uses it. The same system generates inventory reports, both general ones and site-specific ones, detailing what equipment is actually at a particular location.

Ultimately, says Marchand, the key to efficient procurement lies in a flexible outlook. States should focus on setting guidelines and negotiating large contracts, he believes, while giving individual agencies leeway to select the technology that suits their own particular needs.



(continued from page 13A)

term strategy, which may not yield tangible results for another 5 or 10 years, when many current officials will no longer be on the scene. As one state official commented, "To be effective, information-resources management needs more than legislative support—it needs mechanisms and education and time."

The quandary is thus one of deferred versus immediate gratification, and nowhere is it more acute than in budget issues. Information reforms typically cost a good deal of money in the short term, yet they are unlikely to produce significant savings for several years. As one state official put it, "A short-term cost is a long-term productivity gain."

The slowness of the process even in successful states, say Caudle and Marchand, does not indicate that managers have failed to act quickly. Rather, it stems from a basic fact of human nature: To change behavior or a way of thinking takes time. People in government must be educated to tackle their jobs from a statewide perspective, rather than from a parochial view of one agency's needs. To substantiate this argument, Caudle and Marchand point to other management changes of comparable scope that have taken as long or longer: After nearly 30 years, they point out, the most recent wave of state executive-branch reorganizations is still going on.

### To Centralize or Not?

As in other government domains, the question of centralized control in the states' management of information has sparked considerable debate—even acrimony. At issue is whether state information managers will impose government-wide policies or foster agency innovation.

The heart of the matter is the

## The Top Twelve Tools

Type of Technology	Percentage of States* Using It
Electronic Mail	64%
Voice Communications (e.g., voice mail, call-handling)	55
High-capacity Storage (e.g., optical disks)	50
Image Processing/Electronic Data Exchange	50
Distributed Processing	41
Scanning Devices (e.g., bar-code readers)	41
Teleconferencing	36
Desktop Publishing	36
Advanced Computer Graphics	36
Fiber Optics	32
Portable PCs	32
Facsimile Machines	32

\*Twenty-two states were surveyed.

Source: *Managing Information Resources: New Directions in State Government*, Syracuse University School of Information Studies, Syracuse, New York, August 1989.

central state information offices. Despite their differing titles, each such office is usually responsible for the same task: to coordinate information-management policy statewide.

Too often, however, these central offices have tried to fill too many roles. In addition to formulating and communicating an overall policy direction for the state, they have attempted to provide data processing and other services to the state's agencies. As one state official points out, this very diversity has created friction: "First, our role is regulatory; we review agency proposals and we can reject them, and that paints a certain image of our organization.

"Second, we are facilitators," the official continues. "That's our most important hat to wear, to make sure that good ideas get through the process." In addition, he continues, his office functions as both consultant and overseer. "All those roles are hard to

reconcile," he concludes, "and the seeds of adversity will always be there as long as we are in those roles. Plus, they all happen in a political context."

Permeating the conflict between the central state offices and the agencies they oversee is the dynamic of service versus control. Because they are often under political pressure to rapidly improve state operations, the central offices risk becoming sidetracked by a desire to keep the agencies in line. As one state office manager has observed, "We were trying to control processes and trying to provide services, and we really enjoyed the control much more. Agencies were building their own systems and buying personal computers, and that was an affront to us; we were losing power and control."

The state agencies, for their part, welcome the help of the central information office but resent the control, even when it is part of a larger effort to coordinate policy. Many agencies

# G

overning Guide

have viewed the central office as an incarnation of "Big Brother," sometimes even lobbying to overturn its influence. "The central offices should act like a service organization, not like prima donnas," says one agency official. "They need to facilitate, to be technical advisers, to assist; they are a means to an end, not an end."

One item that was certain to kindle emotions in the past was the planning process. In their early years—from 1980 to 1985 or so—many central offices required the state agencies to report in excruciating detail on their information resources and needs. The result: a planning process that was costly, complex and unusually taxing. Florida officials, for example, still

remember with rancor generating massive planning documents on tight deadlines. According to one agency manager in the state, the central office demanded to know "how many printer ribbons you wanted to buy. The level of detail in the first plan was crazy." Worse yet, the planning documents so painstakingly assembled seemed to have little impact on the state legislature's budget decisions.

Many of the tinderboxes that touched off those battles have since been shelved. One key step has been to subdivide the functions of the central office, leaving one organization in charge of policy and planning and a second responsible for providing services.

A newborn service ethic in the cen-

tral state offices is also helping to defuse the power struggle. Where state agencies once had no choice but to rely on the central data center, end users in those agencies today enjoy many more options—including processing the data themselves or taking it to a private provider. The central state information offices, whose operating budgets are underwritten by the state agencies they serve, must therefore work harder to "sell" data-management services to their "customers."

Meanwhile, a number of states are actively exterminating the bugs in the planning process. In Florida, for instance, central office officials have removed several layers of the detail once required in agency reports. And South

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Carolina agencies, which initially resisted centralized planning, now acknowledge that the central state office promises to improve, not expropriate, their use of information resources. South Carolina agency officials report that centralized planning has helped the state to organize information based on its overall needs, rather than on the type of data housed in each agency. "For the first time," notes one Palmetto State official, "we have grouped information in state government according to whom the information serves and what it does, regardless of agency structures."

Essential to the new accord between once-warring factions is the recognition that the central state office can provide

overall policy direction without micromanaging every aspect of the agencies' information resources. "The successful states," says Marchand, "are those that have de-emphasized control and are stressing mutual support."

### A Sampling of Successes

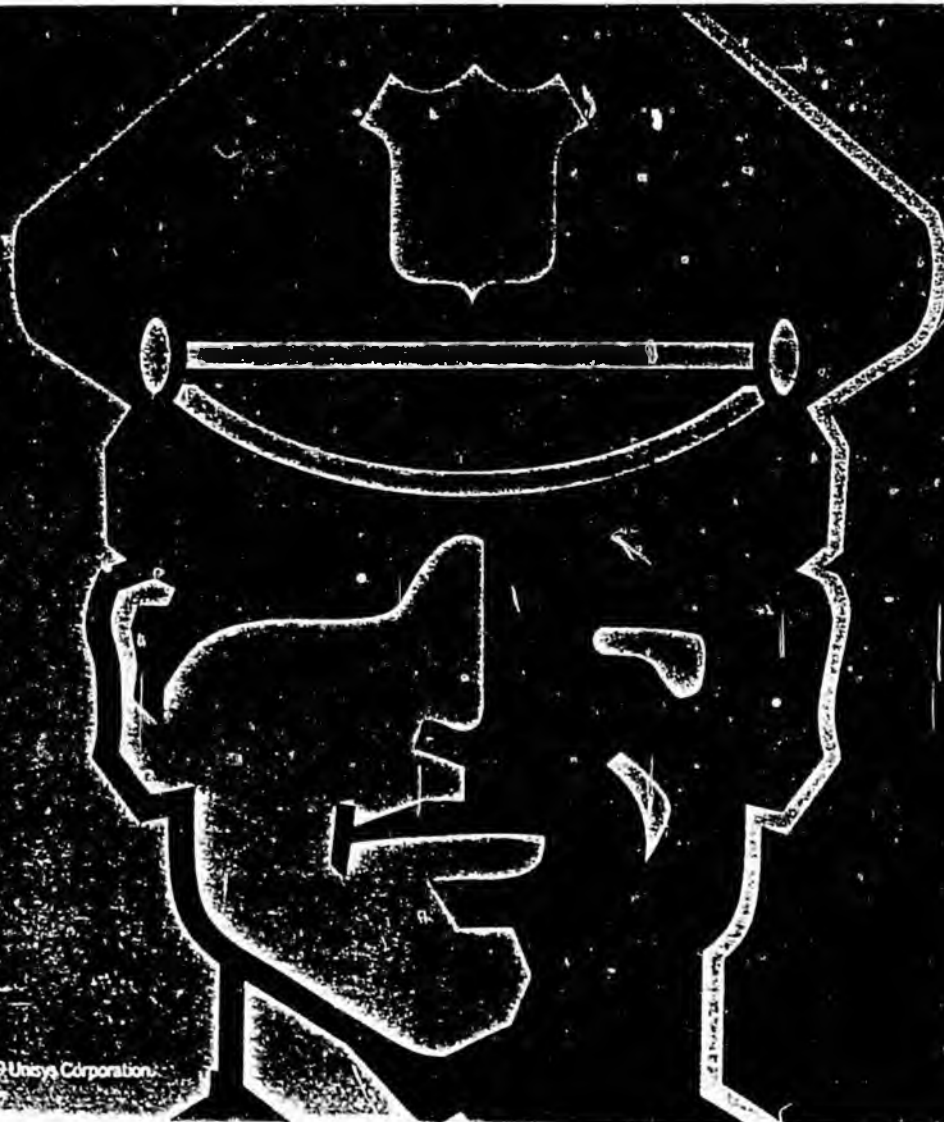
Turf battles aside, many states have succeeded in introducing effective information-management policies. "A lot more states have made progress than we anticipated," says Marchand. "The momentum looks solid. Other states besides the ones we studied are progressing as well."

The states' rate of advance is not really that different from the evolution

of other management functions, notes Marchand, "except that it is taking place in the context of the fastest-changing technology the world has ever seen."

The Caudle-Marchand report identifies a number of domains in which the states have significant accomplishments. They include:

- **Automation.** Most states have automated their administrative systems and are now working hard to automate service delivery as well. In South Carolina, for example, a 1987 study found that 80 percent of state agencies had automated key financial and personnel systems; a majority had done so for budgets, procurement and inventory control.



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The sheer magnitude of the states' computing resources hints at the degree of progress so far. In 1988, Caudle and Marchand estimate, 47 states owned a total of 197,300 microcomputers, a 17 percent increase over 1987. California alone operates 35 mainframe computers, nearly 800 minicomputer, and more than 14,000 PCs. The state government's largest computing facility, the Teale Data Center, hosts 15,000 terminals executing 1.8 million transactions a day.

• **Telecommunications.** Nineteen of the 23 states surveyed have in place or are planning to install a communications network able to integrate voice, data, video and image communications. Seven states—Florida,


Maryland, Montana, Oregon, South Carolina, Texas and Washington—have already developed extensive networks. Florida's SUNCOM network, for example, can handle both digital and analog data communications. The state's transportation department boasts an analog microwave system, while its department of environmental regulation recently unveiled a system for voice teleconferencing.

• **Innovative technologies.** States are devoting substantial resources to cutting-edge technologies that promise to improve everything from service delivery to regulation to decision-making. Many agency officials are introducing technologies that aid end users, such as portable PCs, facsimile machines and

desktop publishing systems, while state administrators are seeking overall improvements in as communications, data access and document handling.

Some states have even established formal organizations to investigate and apply new technologies. In Minnesota, for example, this role is played by a governmental arm known as the Technology Futures office. In California, meanwhile, state-run data centers have joined forces with private industry to examine how the state might make better use of its minicomputer workstations and Local Area Networks (LANs). An office in the state's health-and-welfare data center is even developing an "expert system"—a

*(continued on page 25A)*



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## THEORY INTO PRACTICE

**T**he Syracuse survey uncovered scores of innovative technology uses; some of the more imaginative ones are described below. Although these applications come from a diversity of state programs, they all have two goals in common: to make government workers more efficient and to improve services to the public.

One widely adopted system draws on data-handling technologies that were first developed for automatic-teller machines and supermarket checkout devices. California, for example, is working to replace driver's licenses and ID cards with magnetic-strip cards containing digitized images of photographs and signatures. Such cards would allow information about individuals to be recorded by mechanical card readers, rather than transcribed by hand.

In Michigan, meanwhile, state residents can use "opportunity" cards to gain admission to education and training programs. Citizens of Massachusetts can use "smart" cards to confirm their continued eligibility for health and welfare benefits, while their counterparts in Washington may be able to verify their eligibility for unemployment benefits by using a push-button telephone. In New Hampshire, automatic-teller machines are selling lift tickets at state-owned ski resorts, while in Oregon the same type of machines are being used to deliver welfare benefits.

Other states are using information technologies to track items that would be too difficult or time-consuming to follow manually. Colorado, for instance, keeps an eye on stream flows—and possible floods—in the state's rugged terrain via satellite, while Oregon has a weigh-in-motion system featuring electronic sensors that read special license plates mounted on trucks rumbling down the state's highways. Califor-

nia has a computerized inventory of state real property holdings, organized by agency and location.

A number of systems aim to make information more accessible to state workers. Bank examiners in New York and Florida, to cite one such case, can call up and record data about financial institutions on laptop computers. Welfare workers in Florida can also use an on-line system to summon forth information about recipients of the state's social service programs.

Automated fingerprint retrieval systems are in use in California, Maryland, New York, Oregon and Wash-



ington, while Florida has both that system and one providing access to criminal records as well as prints. Delaware is using videoconferencing to conduct arraignments of prisoners without the security risk of transporting them from jail to court. California is experimenting with using personal computers and video discs to teach young offenders to read.



(continued from page 23A)

computer program that incorporates the expertise and ratiocinative techniques of human specialists—that will help government employees prepare and review certain types of claims.

• **Sharing information.** For reasons that ranged from the pure to the petty, many state agencies once resisted sharing information among themselves. Some were genuinely concerned about possible violations of privacy laws, while others bridled at the prospect of losing their identity within the state bureaucracy. Today, by contrast, a number of states are striving to implement a multifunctional approach to information management, maintaining their data in a single archive benefitting

a variety of agencies.

The multifunctional approach has worked especially well in human services. Utah is devising an on-line database of clients that will enable state workers to determine a resident's eligibility for welfare and other aid. Florida is developing an on-line network that will furnish information about the state's provision of welfare, food stamps, Medicaid, child-support enforcement and refugee assistance. A third state, New York, is working on a "Crimenet" database that aims to bring together information about the state's criminal justice, prison and probation systems.

The statewide sharing of resources has also encouraged the compilation of new geographic information systems

(GIS), which combine data from a variety of sources to reveal details about a specific region. Minnesota has assembled a GIS that interweaves data about each county's business patterns, labor force, population, agriculture and land ownership, while New York has pioneered the use of a GIS for assessing property taxes.

• **Cooperation.** A spirit of cooperation between the executive branch and the legislature characterizes state efforts to improve information management. Agency officials are working to educate and involve key legislators in the process, while lawmakers have become keenly aware of the merits of sound data-management policies.

(continued on page 28A)



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## THE HUMAN FACTOR

As state governments seek better ways to manage data and technology, they often overlook a key element: the employees who use those resources on a daily basis.

No longer is the management of information resources a computer-room pursuit; as of 1989, Caudle and Marchand estimate, more than 420,000 state executive-branch jobs existed in the field. That figure is nearly 20 percent of all state executive employees, excluding educational personnel.

One problem: salaries for state employees involved in information resources pale beside those in private industry. Florida found that state telecommunications workers are paid 29 percent less than in private industry, while state computer personnel receive 18 to 50 percent less. To remedy this, some states are setting higher rates for new positions and upgrading the pay for existing jobs.

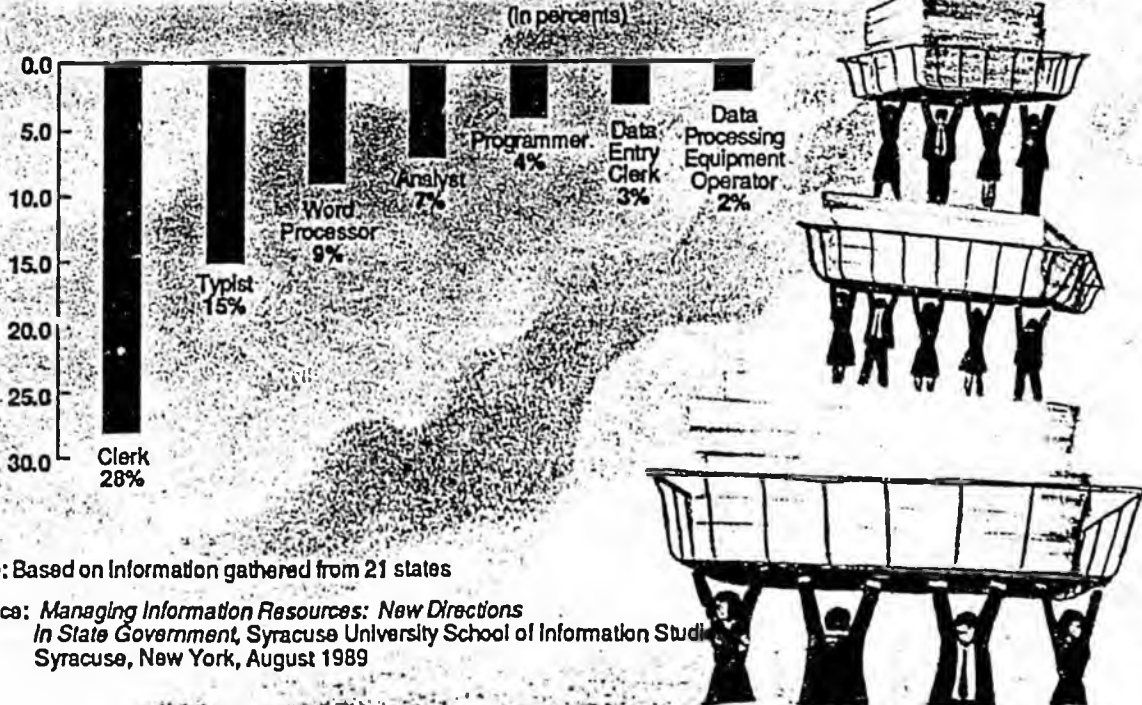
Recruiting employees has become a thorny proposi-

tion at best, while attrition has begun to take its toll among skilled personnel. In 1985, Florida estimated that its turnover rate for employees involved in data processing was three times that of private industry.

A bright spot, say Caudle and Marchand, is training. Most states offer their employees a wide range of sophisticated courses at little or no cost. But even there, tunnel vision can set in. Although many states instruct their workers in how to operate available equipment, the optimum use of information resources demands that the entire work force be trained. "If you're going to improve the quality of service," says Marchand, "you have to pay more attention to human development."

"Corporations spend huge amounts to train their work forces," Marchand observes, "but there has been no comparable emphasis in state government. The need for training isn't taken seriously enough in the public sector."

### THE ROLES PEOPLE PLAY IN INFORMATION RESOURCES



Note: Based on information gathered from 21 states

Source: *Managing Information Resources: New Directions in State Government*, Syracuse University School of Information Studies, Syracuse, New York, August 1989

## THE EIGHT COMMANDMENTS OF DATA MANAGEMENT

1. Information is a valuable government asset; It should be managed to benefit the people.
2. The public should have access to government information, unless such access would jeopardize the privacy of any individual.
3. Information belongs to the government as a whole; agencies are only its keepers and should share it widely among themselves.
4. The information technology employed by a government should encourage all branches of the government to communicate freely with one another.
5. Agencies should collect only the information they need, and managers should seek to minimize the burden on those who must provide it.
6. Governments should develop—and adhere to—a clearly stated design of how they intend to handle information.
7. Because most information is time-sensitive, governments should consider how old their data is in deciding what to do with it.



8. Standards serve a purpose. Governments should strive to get the best technology quickly and economically.

*(continued from page 25A)*

"The legislators are coming more and more from businesses that are automated," observes one state office manager. "We don't need to tell them a second or third time about the difference that information technology can make in management, in analysis and in program decisions. They are experiencing it in their own businesses."

### 1990 and Beyond

Despite this evidence of success, Caudle and Marchand remain realistic about the challenges facing states. The architects of tomorrow's information policies, they note, today face tight budgets, high expectations on the part of political leaders and the

need to comprehend ever-more-complex technologies. Moreover, say the report's authors, some states may not be able to sustain their progress toward better use of information resources; initiatives that succeed early on may later founder because of problems with the state's politics or economy. "States are still a long way from realizing the real payoffs," Marchand believes. "It's not something where you can say, 'They're there now.'"

In the 1990s, as states struggle to move from an emphasis on technological concerns to a broader focus on information-management issues, they will continue to face an array of vexing questions. One is the lack of understanding within state governments of the capacities of computers other than

traditional mainframes and of the potential benefits of a statewide approach to information management. Despite intensive educational efforts within the state, notes one official, "We are still grasping for [computer] literacy." In addition, state efforts in this area need leaders who can alert people in government to the dynamic potential of information-resource management.

A prime source of frustration is that the states' fragmented data structures can keep information managers from answering simple yet significant questions posed by state government executives. Until recently, for example, no one had thought to integrate data on recipients of food stamps with information about Aid to Families with Depen-

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## CONTACT POINTS

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dent Children. As a result, information officials in most states could not say for certain how many state residents were on welfare. Although states worked throughout the 1980s to ensure that their various data systems were compatible, managers have by and large failed to combine data from different sources into a coherent whole. State leaders are therefore demanding technologies that will give them ready access to the information needed to make the best policy decisions.

In addition to designing systems that can answer policy makers' questions, says Marchand, information-resource managers and advocates of change must act with near-missionary zeal to correct habits and outlooks ingrained in

the bureaucracy. "You've got to continually sell the vision to get people to think horizontally rather than vertically," declares Marchand. "Within agencies, information managers have to sell to the program managers and administrators and help them develop confidence in the process." An agency official expresses a similar goal: "I want to expand the horizons of those above me as mine have been expanded."

Finally, the next decade will see the states attempt to dovetail their information resources with those of their counties and municipalities. Although the Syracuse University report does not address this matter in local governments, Marchand is currently planning a study of information-resource management at the county level.

Clearly, state and local governments stand to reap many benefits from coordinating their information and resources. But pitfalls lurk as well. Local efforts to join state voice networks or to buy computers through state purchasing systems, for example, might encounter protests from the local telephone company or from the local government's traditional supplier of hardware. "There's lots of money involved," says Marchand, "and that always raises political questions." Still, the task of including municipalities in the information-management process seems more or less inevitable. "Integrating the local service-delivery arm is the next step," according to Caudle, "and states are going to have to deal with it." □

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