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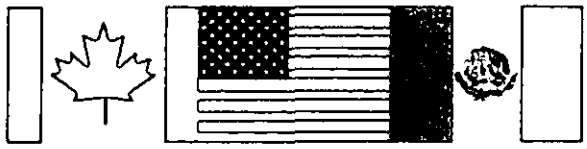

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REQUIREMENTS FOR DEVELOPING AN INTEGRATED STATEWIDE VOTER REGISTRATION DATABASE

by

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Introduction

A study for the Office of Federal Elections, forerunner of the Federal Election Commission (FEC), described the situation facing election administrators in the mid-1970s:

> ▪ *a growing national awareness that voter registration systems need improvement...[an awareness] stimulated by recent judicial actions and by various legislative initiatives*
>
> ▪ *sharply accelerated efforts [by state, city, and county election officials] to explore and establish...improved registration and election systems....and alternatives to former procedures as a result of...recently-mandated requirements*
>
> ▪ *[a] fervent search for more sophisticated and efficient methods to cross-check for duplicate registrations and to effectively cope with the sheer bulk of the information processing and distribution*[1]

The legislative initiative responsible for the large influx of new voters in the 1970s was the 25th Amendment to the Constitution, which lowered the voting age from twenty-one to eighteen. Today, some twenty years later, a new legislative initiative presents election officials with a similar challenge and is the stimulus for new efforts to improve election and registration systems.

That legislative initiative, of course, is the National Voter Registration Act (NVRA) of 1993[2]. Implementation of the NVRA has resulted in large influxes of new voter registrations, in part because of the designation of driver's licensing and public assistance agencies as additional voter registration sites. Implementation of the NVRA has also revealed a need for systems to upgrade the maintenance and storage of accurate voter records. This includes systems to facilitate the transfer and processing of high volumes of voter information from a wide variety of sources, including driver's licensing and public assistance agencies which now have a direct role in processing voter registration applications, as well as systems that to produce the mandatory reports for monitoring NVRA compliance and gauging the Act's effectiveness.

NVRA specifically requires states to conduct a program "to protect the integrity of the electoral process by ensuring the maintenance of an accurate and current voter registration roll." One threat to the integrity of the election process is the problem of individuals registering to vote in multiple jurisdictions, whether intentional through fraud or unintentional through relocation and failure to cancel a previous registration. The American population is highly mobile. The U.S. Census Bureau, which tracks geographic mobility on an annual basis, reported that some 42 million persons, or approximately 16.8 percent of the total population relocated during the period March 1992 to March 1993. Twenty six million (or

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[1] E.F. Shelley and Company, *A Study of State and Local Voter Registration Systems*, Washington, D.C., September 1974.

[2] *National Voter Registration Act of 1993*, Pub. L. No. 103-31.

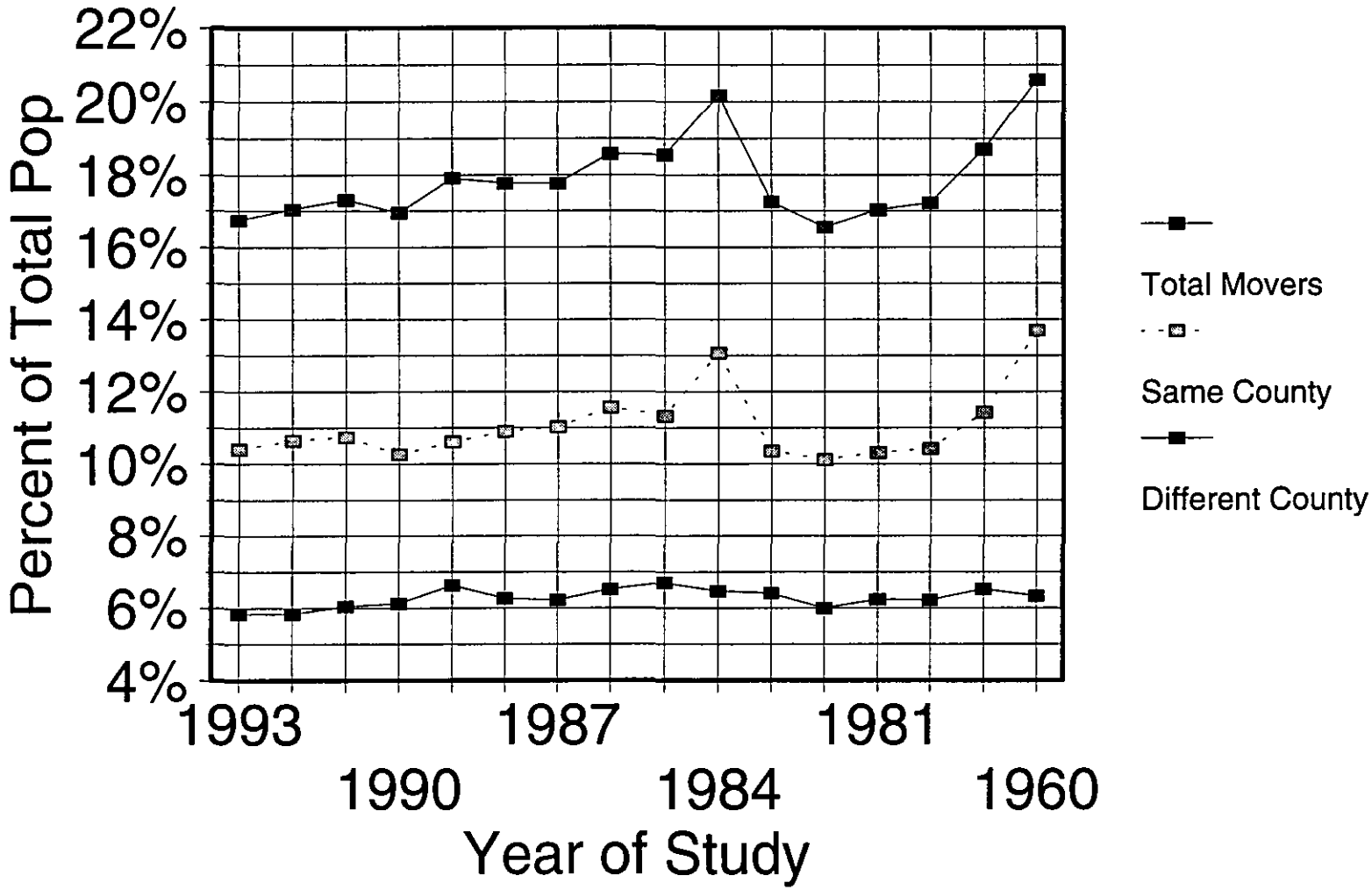
10.5 percent) relocated within the same county, while 14.5 million (10.5 percent) relocated in a different county. Figure 1 shows movers as a percentage of the total population, while Figure 2 shows movers within and out of county as a percentage of persons that moved. Of the 42 million persons that moved, nearly two thirds relocated within a county while one third moved to a different county. An important part of any effort to improve election and voter registration systems are innovations that will facilitate the detection of duplicate registrations within jurisdictions as well as across jurisdictional boundaries.

The maintenance of accurate voter lists will require enhanced communications among many different agencies, including agencies in different jurisdictions, to process new voter registration applications and remove from voter lists persons who are deceased or who are ineligible to vote because of change of residence, a criminal conviction, or adjudication of mental incompetence. Potential sources of information for verifying and updating voter records include the court systems, agencies maintaining vital records, and the United States Postal Service—organizations specifically mentioned by the NVRA.

Although election agencies are improving election and voter registration systems in response to the NVRA, they also face demands from other sectors to improve the accuracy and timeliness of election and voter registration information. Political organizations need up-to-date voter lists for campaigns, court systems require accurate voter lists for jury selection, and the public, the news media, and candidates for elective office seek better and quicker access to election results and voter registration statistics.

With advances in information technology, the automation of governmental functions has become essential for the delivery of services. Thus many states have begun to automate and centralize systems for the maintenance of voter records. Charged with an advisory role in implementing that NVRA, including the task of facilitating the exchange of information among the states, the Federal Elections Commission (FEC) has contracted for a study of current automated systems for processing voter information and the design of practical models that states may use to integrate local voter registration databases. Specifications for the study require that these models include provisions for linking the resulting statewide voter registry to databases maintained by organizations such as state Public Assistance Agencies, Bureaus of Vital records, and Transportation Departments, to facilitate the transfer of information needed to maintain and upgrade voter records. The models must also provide alternatives to accommodate the variety of automated systems that now exist so that the goal of implementing a statewide voter registration system can be accomplished as efficiently and as economically as possible.

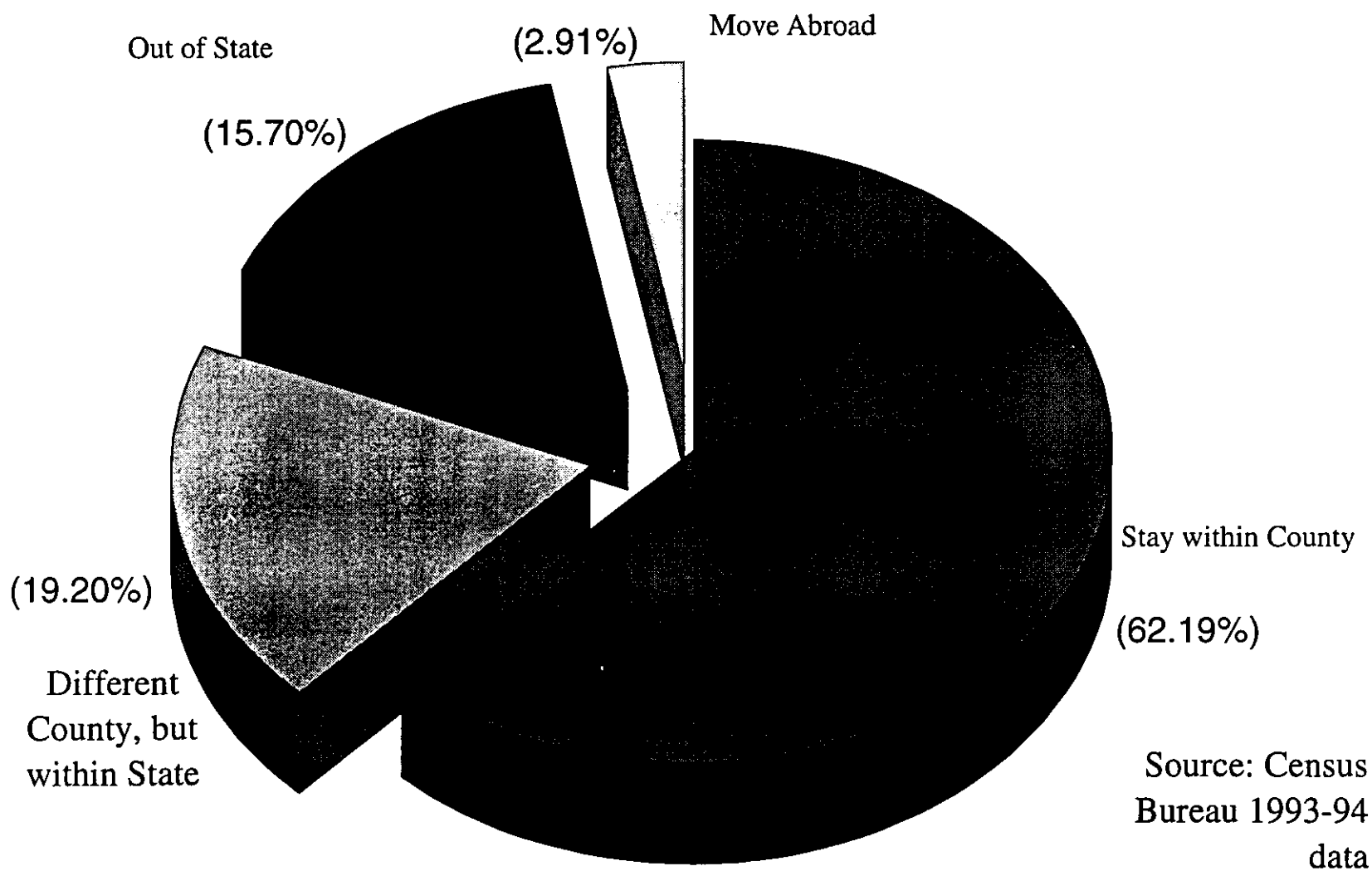
Percent Movers



Produced by Election Data Services, Inc.

Where did the movers go?

(Out of County & With-in County)



Source: Census Bureau 1993-94 data

Study for the Federal Election Commission (FEC)

Under contract with the FEC, Election Data Services, Inc., has conducted a study that included the following activities:

(1) Surveys of state and local agencies and interviews with officials of national organizations to obtain information about current statewide systems for maintaining election, driver's license, public assistance, and vital records;

(2) Site visits to state elections, driver's licensing, and public assistance agencies to interview personnel and to examine and document already existing computerized statewide record keeping systems;

(3) Analysis of research to (a) identify the fundamental requirements for developing an integrated voter registration database; (b) design a general model of an integrated voter registration database, including alternatives; and (c) design a model plan for the step-wise development and implementation of an integrated voter registration database.

Current Statewide Voter Registration Systems

Historically, state and local governments have shared responsibilities for administering elections. Requirements for voter registration vary among the 50 states and methods for implementing those requirements within the states vary locally from jurisdiction to jurisdiction, depending on individual needs and available resources. Some jurisdictions have continued to maintain voter records manually while others have established automated systems for record keeping utilizing personal computers, minicomputers, and mainframe computers. Jurisdictions with computers use a wide variety of voter registration software, with larger jurisdictions more likely to use voter registration software developed by local MIS departments. But in the past five to eight years, software from commercial vendors has been used increasingly, and the trend now appears to be towards Windows-based, commercial voter registration software.

The table in Figure 3 shows which states have statewide voter registration systems or are considering or implementing proposals for such systems. For this discussion the states have been divided into the following six categories:

I Considering proposals for a statewide voter registration system.

II Currently developing a statewide voter registration system.

III No statewide voter registration system.

IV Central collection of local voter registries periodically for activities such as checking for duplicate registrations and production of statewide voter lists. Local jurisdictions retain possession of *official* voter registries.

V Statewide voter registration system provides *some* local jurisdictions with on-line access to a central voter database. Other jurisdictions retain possession of *official* voter registries but periodically submit copies of the registries to update the central database.

VI Statewide voter registration system provides *all* local jurisdictions with common software and on-line access to a central voter database.

Statewide Voter Registration Systems

Compiled as of 25-Apr-96

State	Proposals		Current Systems				Comments
	I Under Consideration	II Under Development	III No System	IV Periodic Collection of Local Voter Registries	V Some Local Jurisdictions On-line	VI All Local Jurisdictions On-line	
Alabama					X		40 of 67 counties on line, 5 send monthly tapes
Alaska						X	Elections are administered by the state.
Arizona				X			Quarterly collection to check duplicate registrations.
Arkansas		X		(Implementing)			State will supply software to each county.
California	X			X			Currently quarterly collection, but proposal for new system being solicited.
Colorado					X		Weekly collection of registries from counties not on-line.
Connecticut		X				(Implementing)	
Delaware						X	
Florida	X			(Considering)			Commission recommended collection system.
Georgia		X				(Implementing)	Largest counties are not yet on-line.
Hawaii						X	System is maintained by the largest county.
Idaho			X				
Illinois	X			X			Currently limited collection effort. Study planned.
Indiana				X			Collection twice in each election year.
Iowa				X			
Kansas				X			Quarterly collection. Not now checking duplicate reg.
Kentucky						X	
Louisiana						X	
Maine			X				
Maryland	X				X		14 of 24 counties online. Study plannned.
Massachusetts		X				(Implementing)	
Michigan		X				(Implementing)	All counties and major cities will have terminals.
Minnesota						X	All counties have terminals.
Mississippi			X				
Missouri		X		(Planned)			Largest counties will keep existing systems.
Montana			X				
Nebraska	X		X				Considering a study of statewide system.
Nevada			X				
New Hampshire			X				
New Jersey				X			Files sent monthly to state.

Compiled by Election Data Services, Inc., 1225 I Street, Suite 700, Washington, DC 20005, (202) 789-2004

Statewide Voter Registration Systems

Compiled as of 25-Apr-96

State	Proposals		Current Systems				Comments
	I Under Consideration	II Under Development	III No System	IV Periodic Collection of Local Voter Registries	V Some Local Jurisdictions On-line	VI All Local Jurisdictions On-line	
New Mexico				X			
New York			X				
North Carolina	X		X				Completed study. Legislature is considering proposal.
North Dakota							No voter registration.
Ohio				X			Semi-annual collection to check duplicate registrations.
Oklahoma						X	
Oregon			X				
Pennsylvania	X		X				Study of statewide system is currently underway.
Rhode Island			X				
South Carolina						X	Mainframe system; most counties have dumb terminals.
South Dakota			X				
Tennessee		X		(Implementing)			Daily collection.
Texas		X			X		Anticipate 200 of 259 Counties with on-line capabilities
Utah		X		(Implementing)			Monthly collection, initially; daily collection, ulimately.
Vermont			X				
Virginia						X	
Washington			X				Occasional collection (no regular interval).
West Virginia		X		(Implementing)			Monthly collection from approved vendors.
Wisconsin			X				
Wyoming		X			(Implementing)		Periodic collection of registries from counties not online.
Dist. of Columbia							
Total	7	11	16	15	5	13	

Compiled by Election Data Services, Inc., 1225 I Street, Suite 700, Washington, DC 20005, (202) 789-2004

After evaluating the survey results, information obtained from interviews and site visits, documentation for existing record keeping systems, and other research materials collected for this study, the fundamental requirements for developing an integrated voter registration database were identified. The recommended fundamental requirements are (1) a definition of the scope of the statewide voter registration system, (2) an assessment of the current state information management structure, (3) the preparation of a network configuration management plan, (4) the preparation of a security management plan, and (5) the selection of an operating system, (6) the preparation of a comprehensive project management plan, (7) the preparation of a cost management plan, (8) the setting of a realistic time frame for database development, (9) the conduct of a thorough evaluation of the capabilities of current elections personnel, and (10) the formulation of detailed data descriptions for the management of data dictionaries.

Defining the Scope of the Statewide Voter Registration System

The first step in the process of developing an integrated voter registration database is to define the scope of the statewide system. As shown in Figure 3, states that have already established statewide voter registration systems have generally followed one of three approaches: (1) Development of a fully interactive statewide system that provides all local jurisdictions with common software and on-line access to a central voter database; (2) development of a system that provides *some* local jurisdictions with on-line access to a central voter database, while allowing other jurisdictions keep existing systems and collecting copies of local voter registries for periodic updating of the central voter database; and (3) periodic collection of local voter registries by the state elections authority for activities such as checking for duplicate voter registrations and production of statewide voter lists.

Fully interactive statewide system. A fully interactive statewide voter registration system generally operates with a central voter database and a single voter registration application all residing on a central computer (Figure 3, Category VI). Typically, "dumb terminals" are installed in local election offices around the state and are connected to a central computer through the state telecommunications network to provide local offices with immediate and continuous access to the central voter database. Local offices use the terminals to initiate normal, day-to-day voter transactions, such as qualifying new registrants and removing the names of ineligible voters from the rolls. The transactions are processed by the central computer, which updates the central voter database simultaneously.

Kentucky, Louisiana, Minnesota, and Virginia are among the states that adopted this approach in the late 1970s and early 1980s and have continued to maintain stateside systems. These systems generally started with the collection and standardization of local voter registries, with local jurisdictions giving up some local autonomy. The advantages of this approach include (1) a single, central voter database that is updated simultaneously with the processing of each local voter transaction; (2) a single voter database that can be updated on a statewide basis to remove the names of registrants who are deceased or no longer eligible to vote because of felony convictions or incompetency adjudications, provided such information can be obtained electronically; (3) a single voter database that can be updated on a statewide basis with change-of-address information from a national service such as NCOA (U.S. Postal Service National Change of Address); (4) a current voter database that can be

searched on a statewide basis to identify potentially duplicate or fraudulent voter registrations; (5) a single database from which voter lists can be produced and distributed to candidates for elective office; (6) a system affording a high level of standardization, with all offices using the same hardware, software, and operating procedures; (7) a system sustaining a simpler network architecture because of common hardware and software operations; (8) a system conveying built-in network support and management from information technology professionals at state-level MIS and elections offices; and (9) a system providing a significant level of peer group support (one election supervisor to another), with all offices using the same hardware and software.

The disadvantages of this approach include (1) the cost of developing, acquiring, or changing voter registration software; (2) the replacement cost of hardware for the new system, particularly, the central system; (3) the transitional costs of installation of the new system, retraining of elections personnel, and disruption of on-going voter registration operations; (4) expensive communication links between local and state election offices; (5) the loss of flexibility to customize software for special needs of a local office (e.g., a special inquiry or report); (6) interruption of voter registration operations statewide whenever the central computer or the state telecommunications network is shut down; (7) greater dependence on a single hardware and software vendor; and (8) the potential that large reports, such as poll books for election day, need to be generated centrally and shipped to local jurisdictions.

States considering this approach will also have to address issues of state versus local control of voter registration operations. Because a central authority will have to assume responsibility for management of networks, equipment, and the central voter database, local jurisdictions will have to relinquish some autonomy. Special determinations must also be made on where specific operations will take place—for example, can poll books and poll lists be printed in each local jurisdiction prior to an election or be printed at a central site and delivered to each local office.

Central voter database with limited local access. Under the second approach (Figure 3, Category V), the state elections authority collects copies of local voter registries for processing to create and periodically update a central voter database. Files containing information from local registries are collected in a standardized format and at some interval (e.g., weekly, monthly, or quarterly). After updating the central voter database, the state elections authority may search the database to identify potentially duplicate or fraudulent registrations. Lists of potential duplicates can then be sent to local offices for investigation and action to remove ineligible voters from the rolls.

Local election offices would have the option of acquiring hardware and software that would provide online access to the central voter database or maintaining possession of their respective voter registries and computer systems. Those gaining online access to the central voter database would conduct voter registration operations much like local election offices under the first approach. They would initiate normal, day-to-day voter transactions, such as qualifying new registrants, and the central voter database would be updated as the transactions are processed. To maintain the central database, the state would need only to collect copies of voter registries from local jurisdictions without online access to the central database. After periodically updating the database, the state elections authority would need to provide lists

of potentially duplicate registrations to jurisdictions for resolution. Local offices without online access could still establish telecommunications links with the state elections office to facilitate the electronic transfer of copies of local voter registries and the lists of duplicate registrations.

Colorado and Texas are among the states that have adopted this second approach to a statewide voter registration system. The advantages of this approach include (1) a single central voter database for the detection of duplicate registrations and the production of statewide voter lists; (2) a single voter database that can be updated on a statewide basis with change of address information and the names of decedents, felons, and other individuals no longer eligible to vote; and (3) for jurisdictions electing not to gain on-line access to the central voter database, protection of investments in existing computer systems, retention of a higher level of local control over voter registration operations, and minimal disruption of local voter registration operations, requiring only the periodic transmittal of voter files to update the central voter database and changes of current system configurations only if online and electronic data transfer capabilities are installed.

The disadvantages of the second approach include (1) a central voter database that is less current for the detection of duplicate voter registrations and production of statewide voter lists—the currency of the database depends on the length of the interval for submission of local updates; (2) a complex network architecture for electronic data transfers and online database access because of the diverse features of local voter registration systems; (3) exposure to potentially high data communications costs for online inquiry sessions with the central voter database; (4) substantial data conversion, software validation, and other costs to maintain communications links to the state elections office whenever local voter registration systems are modified; and (5) constant pressure on administrators of the statewide voter registration system to relax standards, make exceptions, and adopt solutions at the lowest common denominator to accommodate local systems operating with the least sophisticated technologies.

Central collection of local voter registries. Under the third approach (Figure 1, Category IV), copies of local voter registries are collected periodically by the state elections authority for activities such as checking for potentially duplicate voter registrations and production of statewide voter lists. The interval between collections typically ranges from one to three months among states that have adopted this approach. Local election offices would maintain possession and control of their respective voter registries and would use their own computer systems to conduct voter registration operations. The state elections authority would periodically merge files of local voter registries for searching to identify potentially duplicate or fraudulent voter registrations. It would then send lists to local offices for investigation and removal of duplicates from local registries. The state elections office might also be able to serve as a clearinghouse to receive and distribute information from state agencies or other outside sources relating to address changes, death notices, and notices of incompetency adjudications.

The advantages of this third approach include (1) a means for the detection of duplicate registrations and the production of statewide voter lists; (2) protection of local jurisdictions' investments in existing computer systems; (3) retention of a high level of local

control over voter registration operations; and (4) minimal disruption of local voter registration operations to create and update the central voter database.

The disadvantages of the third approach include (1) a database (aggregate if local voter registries) that is even less current for the detection of duplicate voter registrations and production of statewide voter lists on account of the interval updates are received from local jurisdictions; and (2) recurring costs to the state elections authority for reformatting and conversion of local voter files to aggregate local voter registries.

Assessing the Current State Information Management Structure

As the scope of the proposed statewide voter registration system is being defined, coordinators of a project to develop an integrated voter database should make an assessment of the state's current information management structure. This assessment will not only help determine what type of statewide voter registration system is feasible, but also help define what basic specifications on communications capabilities and systems development should be included in a Request for Proposals (RFP) for a statewide voter registration system. It is important that decisions about these basic specifications be made by project planners, rather than a prospective vendor.

If the proposed statewide voter registration system is to link state and local election offices for the electronic transfer of voter files from local election offices to the state office, it will be necessary to determine what communications facilities are already available or will need to be constructed to implement the proposal. Questions project planners should consider in making this assessment including the following:

1. Is there a telecommunications network that enables governmental organizations throughout the state to communicate with each other electronically?
2. If a statewide telecommunications network exists, which organizations currently use this network?
3. Could state and local election organizations gain access to this telecommunications network through subscription, sharing of costs, or leasing of equipment?
4. Which communications protocols does this network support—e.g., X.25, SNA (Systems Network Architecture), or TCP/IP (Transmission Control Protocol/Internet Protocol)?
5. Is this telecommunications network governed by fault, security, accounting, configuration, and performance management plans?
6. How reliable is this telecommunications network and what would happen it were to shut down on election night or at a time of heavy registration activity?

If the proposed voter registration system is to provide local election offices with online

access to a computerized central voter database, project planners should determine whether the current operations of the state data processing center or of the state elections office are of sufficient size and sophistication to provide adequate support. Questions they should ask include the following:

1. What degree of central control does the state data processing center exercise over the development of information systems?
2. Which management systems and database environments are available for application development and support (e.g., Ingres, Oracle, INFORMIX)?
3. Which programming languages are available for application development and support (e.g., C, Ada, PL/1, or Pascal)?
4. Has the state data processing center developed data naming standards or data dictionaries that applications developers must use?

Preparing a Network Configuration Management Plan

If the proposed statewide voter registration system is to be fully interactive or one providing local election offices with online access for inquiries of a central voter database, project planners should prepare a network configuration management plan to facilitate implementation of the system and to define basic specifications for a Request for Proposals (RFP). This will involve the consideration of questions such as the following:

1. What will be the response time (i.e., the time that elapses between the issuance of a request and the provision of data) when election offices in each of the state's local jurisdictions are attempting to access the central voter database?
2. What procedures must be developed to regulate the daily processing of local voter transactions and the updating the central voter database without overburdening the system?
3. How will local jurisdictions be able to download their respective portions of the central voter database for printing an updated voter list or will the printing have to be done centrally?

A complex undertaking within the overall scheme of development of a statewide voter registration system is the design of a telecommunications network. The telecommunications network design process has a whole separate task order of its own and includes the preparation of network fault management, performance management, and accounting management plans. If an existing state telecommunications network to link state and local election offices is not available for a statewide voter registration system, serious consideration should be given to subcontracting the design and assembly of a telecommunications network to an organization with special expertise in network communications. One state that implemented a statewide voter registration system while this FEC study was underway subcontracted the network development portion of its project to a local telephone company.

The project was successfully completed for a reasonable cost within a relatively short period of time.

Preparing a Security Management Plan

Successful implementation of a statewide voter registration system will also require the development of a security management plan for the protection of voter records from tampering, destruction, and unlawful disclosure. Such a plan must also provide for measures to prevent unauthorized individuals from gaining access to the system as well as the recovery and restoration of voter files and voter registration systems in the event of a disaster. The security management plan should address the following elements:

- authentication (i.e., validation of names and passwords for authorized users to log onto networks supporting the central voter database and the voter registration application)
- methods for restricting access to sensitive data to certain authorized users
- steps for building audit files and "activity alert files" to record database changes
- encryption for data transmissions
- design of "firewalls" between internal and external networks
- database-level security lockout from the application
- table-level security lockout within the application
- record-level security lockout within the application
- field-level security lockout within the application
- procedures and software for unattended full, incremental, and differential backup of voter files
- agreements and off-site facilities for storage of backup tapes

Selecting an Operating System

Another crucial aspect of the development of an integrated voter registration database is the selection of an operating system that can support the telecommunications network and the voter registration application. Careful consideration should be given to this selection, given the relatively complicated software environment of various operating systems. Popular options among operating systems include the following:

MS-DOS	Microsoft Disk Operating System: a single-tasking, single-user, operating system with a command-line interface
OS/2	A protected-mode, virtual memory, multi-tasking operating system

Windows	A multi-tasking, graphical user interface environment that runs on MS-DOS-based computers
Windows 95	A self-contained, multi-tasking operating system with a built-in graphical interface, not dependant on MS-DOS
Windows NT	A self-contained, multi-tasking operating system with a built-in graphical interface, not dependant on MS-DOS
Unix	A multi-user, multi-tasking operating system for minicomputers

Preparing a Project Management Plan

The success of a project to develop a statewide voter registration system will depend greatly on the preparation of a comprehensive project management plan and strict adherence to that plan throughout the implementation phase of the project. The project management plan should include steps for initiating, monitoring, and controlling the development of a statewide voter registration system as well as compilation of a detailed list of system specifications and quality assurance procedures. The compilation of system specifications *on paper* at the beginning of the project will help ensure that the prospective vendor ultimately delivers the system that project planners originally envisioned. Although many contemplating a new voter registration system incorporating the latest technologies will look at this sort of planning as an ominous roadblock to realization of project goals, formulation of a comprehensive management plan will help project planners avoid a serious "pile-up" on the information superhighway.

Project planners that created statewide voter registration systems in the 1970s had more limited choices among mainframe computers, rather than the many options presented by today's personal computers. Mainframe computers, which had been around for many years before, provided a certain stability and a sort of "mainframe mentality" that emphasized a large amount of project control and management. Despite the large size of the projects, states developing voter registration systems in the 1970s were able to implement mainframe-based systems that met their specifications in large part because the projects were managed effectively and efficiently.

Given the many options now available, there is probably an even greater need for sound project management so that systems are developed in an orderly and controlled manner as opposed to haphazard development through an evolutionary process as a project progresses. Evolutionary development risks greater exposure to cost overruns and greater chance of failure as a result of poor planning.

Outline of a Project Management Plan. Effective project management recognizes three processing phases. And a sound project management plan as outlined below should, at least, address the following elements under each phase.

Outline for a Project Management Plan

I. Pre-development processes:

(a) Assessment of the need for an integrated voter registration database
(b) Preparation of a functional requirements analysis that will determine the architecture of the proposed integrated voter registration database

II. Development processes:

(a) Compilation of a detailed list of software requirements and establishment of priorities
(b) Compilation of a detailed list of systems interface requirements and establishment of priorities
(c) Database design
(d) Actual programming and implementation
(e) Incremental testing of applications
(f) Systems documentation
(g) Training of users and technical staff

III. Post-development processes:

(a) Installation of the new system and conversion from existing manual or automated systems
(b) Operation and support of the new system
(c) Database maintenance
(d) Training of users and technical staff

In addition, the following elements should run concurrently throughout all three processing phases: (1) Verification and validation of user needs, (2) management of programming environments and the relatively complicated environment of operating system and database management system software, and (3) project management reporting.

The implementation and maintenance of the statewide voter registration system will require the development of and adherence to software life cycle processes, a software management plan, and software verification and validation plans. Recommended models for such plans are the following standards developed by the Institute of Electrical and Electronics Engineers, Inc. (IEEE) and approved by the American National Standards Institute (ANSI):

1. *IEEE Std. 1074-1991 for Developing Software Life Cycle Processes (ANSI)*
2. *IEEE Std. 1058.1-1987 for Software Project Management Plans (ANSI).*
3. *IEEE Std. 1012-1987 Software Verification and Validation Plans (ANSI)*

Critical success factors. A useful tool for managing large-scale projects involves a determination of "critical success factors." Critical success factors force project managers to focus constantly on the question of whether or not sufficient resources are being devoted to things that will ensure continued success of the project. They are intended to help project managers avoid the common mistake of diverting attention to short-term goals, immediate problems, and immediate opportunities. The study team has developed the following critical success factors for a project to implement a statewide voter registration system:

- **Commitment of political leaders in the executive and legislative branches of state government to develop the system.** Voter registration systems affect fundamental legal rights of citizens and sensitive political rights and responsibilities. Without continuing high-level commitment, other issues can get in the way of successful implementation.

- **Stable and adequate funding sources for the project.** If a project is under-funded or if funding is unstable during the first few years of a project, adequate planning and implementation will not be possible.

- **Acceptance by the system's users.** If the intended users of the voter registration applications are unwilling to accept the applications, there is a substantial probability of non-compliance with basic data accuracy and timeliness in the applications.

- **Ability to cope with the inevitable resistance to change that such a project will involve.** Statewide voter registration projects involve considerable changes in the way state and local organizations do business. There will be resistance to those changes and the state's political leaders must be ready to cope with that resistance.

- **Selection of a system alternative that is flexible enough to meet demands and requirements that change quickly and often.** Even as the applications are implemented, the needs and requirements that brought them into being will change. Selection of a flexible alternative will ensure the ability of the application to meet those changing needs.

- **A willingness to set a project management method and adhere to it.** Setting plans is often a difficult and time-consuming task at the beginning of a project. All too often, as deadlines grow near or resources dwindle, there is a temptation to abandon the project management plan and "get to the bottom line." These temptations frequently mean that a well-planned project fails because the plans are not followed.

- **Adequate information systems skills and training among both management and users.** It is easy to talk about the needs and requirements for adequate skills and training among both management and users. It is more difficult to meet those needs and requirements in the face of resistance to change and funding limitations. Training budgets frequently are the first to be cut during periods of retrenchment, but training and support at all levels are necessary for these applications.

Preparing a Cost Management Plan

A comprehensive project management plan will also provide the basis for preparation of a cost management plan, another critical element in the development of a statewide voter registration system. Compilation of detailed specifications for the voter registration system at the beginning of the project will help reduce the number of change orders that will need to be made to a prospective vendor's contract. Measures to control the number of change orders will minimize the possibility of large cost overruns due to unexpected expenses.

Compilation of detailed specifications for the voter registration system in the early project stages will also provide the basic information needed for a thorough investigation of cost sharing arrangements for implementation of the project. Local governments present one potential area for cost sharing arrangements. Because the NVRA involves other organizations besides elections agencies in efforts for improved maintenance of voter records and enhanced citizen opportunities to register to vote, the administration of state driver's licensing and public assistance programs, court and vital records administration, and state management information systems (MIS) programs present potential opportunities for cooperative ventures to facilitate record management in conjunction with the implementation of statewide voter registration systems. Prospect analysis may also be worthwhile in connection with the implementation of statewide voter registration systems to identify foundation grants for innovative projects aimed at improving overall election administration.

Preparation of a cost management plan will be an effective tool for the budgeting process to ensure successful implementation of the statewide voter registration system. Cost management and project management plans will provide sufficient resources for planning and documenting budget requests to executive and legislative organizations for adequate and stable funding of the project.

Setting a Realistic Project Time Frame

Measures to implement the NVRA has fostered many of the current efforts to improve election and voter registration systems. While the NVRA provides a stimulus for initiatives to improve election administration, deadlines in the Act are also pressuring states to act quickly. Development of an integrated voter registration database for a statewide voter registration system involves a considerable amount of time, and successful implementation of such a project requires the setting of a realistic time frame.

By evaluating each of the major tasks outlined by the project management plan, project planners can devise a schedule that will allow an adequate amount of time to complete each

phase of the project: (1) the initial assessment and preparation of system requirements, (2) design of the database, (3) development and testing of applications, and (4) training of personnel. Seemingly routine activities such as the conversion of data and the development of standards for data entry require an enormous amount of attention to detail and should not be overlooked to devising the project implementation schedule.

Evaluating the Capabilities of Current Elections Personnel

While considerable attention will necessarily be devoted to the development of voter registration applications, project planners should not neglect the personnel that will be using the applications. As requirements for the statewide voter registration system are being developed, an assessment should be made of the qualifications and capabilities of current staff in state and local election offices. This assessment is necessary to identify (1) which personnel are readily able to operate the new system, (2) which new positions will need to be created to implement the new system, and (3) what additional training will be necessary to enhance the qualifications of other staff.

Managing Data Dictionaries

Requirements for development of an integrated voter registration database should include preparation of a plan for managing data dictionaries. This plan should include standards for the entry of various types of data as well as naming conventions or data dictionary definitions for names, addresses, voter identification numbers, voter participation fields, party of preference, and other items that will be included in the central voter database.

Development of the voter registration application will also require the formulation of and adherence to uniform standards for the following, although much of the final data entry capability will depend on the final implementation alternative that is selected.:

1. Data contents, data formats, and scheduling of all data entry and database update activities

2. Online, interactive data-entry capability, with the potential for edit-check and range-check capability on all data items

3. A data dictionary capable of being implemented in either active or passive modes for the application

4. Data entry modules capable of interface with both standard OCR and graphics scanners and capable of supporting data editing and verification through scanning operations.

5. A "Graphic User Interface" for the data entry routines as well as a "non-Graphic User Interface" capability, selected by the data-entry user.

6. Data entry modules to allow local election offices to generate

transaction files containing voter registration records to be added, deleted, or changed in the central voter database

7. Batch data verification and editing modules to verify and edit the transaction files transferred from the local election offices to assure the validity and uniformity of the content and format of all fields in all records in the transaction files

8. Batch data entry modules to enter voter registration records from the transactions files generated by local election offices into the central voter database

9. Double-commit database update and confirmation operations when adding, modifying, or deleting records from any tables in the central voter file database

10. Ability for simultaneous record-by-record data entry sessions with complete data integrity for all individual entry transactions and with minimal performance degradation to allow for the possibility of multiple data entry operators in each of the local jurisdictions updating their files at the same time

11. Capability to produce a transaction audit file for any update session that will note, at least, the name of the operator who generated the database change, the date of the database change, the contents of the record before the change, and the contents of the record after the change.

Management of these data dictionaries is of critical importance and can doom a statewide voter registration system to failure if not done properly—consider 100 local jurisdictions using different systems but trying to access the same voter registration database. Management of data dictionaries for development of an integrated voter registration database involves the consideration of the following questions:

Names of Persons

- Should a name be entered in (1) upper case characters or (2) mixed characters (upper and lower cases)?
- Should a name be entered in (1) a single field or (2) separate fields for first name, middle name, and last name?
- Should a record contain a (1) full middle name or (2) middle initial only?
- Should hyphens and apostrophes be (1) retained or (2) dropped?
- Should punctuation such as commas and periods be retained or dropped (e.g., *Adlai E. Stevenson, III* or *Adlai E Stevenson III*)?

- Should special characters be (1) retained, as in *Peña* or *Yüan*, or (2) replaced by Latin characters (*Pena* or *Yuan*)?
- How should titles, initials, particles, and numerals be handled (e.g., *Reverend*, *R.B.W. Lewis*, *Martin Van Buren*, and *Adlai E. Stevenson III*)?

Addresses

- Should an address be entered in (1) upper case characters or (2) mixed characters (upper and lower cases)?
- Should an address be entered in (1) a single field or (2) separate fields for street number, street name, street type, suffix direction, and apartment number?
- Should state names be abbreviated with standard U.S. Postal Service abbreviations?
- Should street names be abbreviated whenever possible (e.g., *St.* for *Saint Francis* or *1st* for *First Avenue*)?
- Should punctuation such as commas and periods be retained or dropped from street addresses (e.g., *1225 I St., N.W.* or *1225 I St NW*)?
- Should street types be abbreviated whenever possible (e.g., *Ave.* for *Avenue*)?
- Should directional indicators be abbreviated whenever possible (e.g., *NE* for *Northeast*)?
- Should addresses be entered with (1) five-digit ZIP Codes, (2) nine-digit ZIP Codes, or (3) eleven-digit ZIP Codes?
- Which format should be used for entering dates [*MMMMMMM-DD-YY* (October-04-1990), *MMM-DD-YY* (OCT-04-90), *MM-DD-YY* (10-04-90), etc.]?
- How will coding for the year be handled at the turn of the century (1900 to 2000)?