

Development Management Systems

Quick Study
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DEVELOPMENT MANAGEMENT SYSTEMS

By Dennis A. Sandquist, AICP

Quick Study




The Urban and Regional Information Systems Association
1460 Renaissance Drive, Suite 305
Park Ridge, IL 60068

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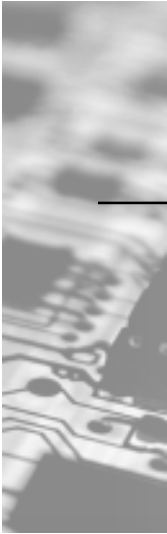
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Introduction

About the author:

Dennis Sandquist has a Masters of City and Regional Planning degree from Rutgers University. He is a Principal Planner with the Lake County, IL, Department of Planning and Development, where he is currently managing the implementation of a new development management system.

This report provides an overview of development management systems with an emphasis on describing the functionality of the current generation of systems. An agency's selection of a system must be based on a careful comparison of its needs and priorities to the features and strengths of the available systems. But, part of determining an organization's needs requires knowing what is available. This monograph is intended to provide this knowledge.

Development Management Systems, within the context of this paper, refers to automated systems encompassing the computer hardware, software, and associated technology designed to facilitate a local government's management of land planning, permitting, and code enforcement-type activities. Other terms commonly utilized for these types of systems include "permit systems," "permit tracking systems," and "land management systems." However,

none of these terms adequately captures the range of activities engaged in by the agencies utilizing such systems. The term "development", as used here, is intended to encompass the full cycle of land use and construction, all of which must be monitored, reviewed, and approved by local governments. Figure I contains a partial list of the local government

Figure I

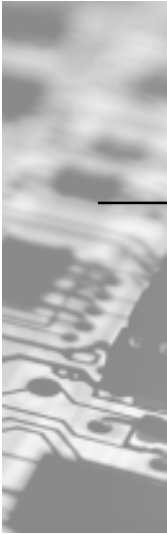
Planning and Regulatory Activities	
Zoning Case Management	Building Permits
Subdivision Reviews	Temporary Use Permits Site Plan Reviews Site Development Permits
Variances	Building Inspections
Business Licenses	Building and Property Complaints
Liquor Licenses	Building Code and Zoning Violations

planning and regulatory activities that can be included in development management systems.

At a minimum, development management systems contain database management and process management. The database component contains records of the agency's activities. In many systems, the database can also contain property records and people records. Development management systems can also provide additional functionality such as cash management and billing, mapping, and remote access.

Little vendor neutral literature is available on development management systems. The American Planning Association (APA) and International City/

County Management Association (ICMA) have each published guides that cover a range of municipally oriented software products. APA's "Planning Software Survey 1990" was a one time publication. ICMA has published its reference guide annually since 1987. The information contained in these reports is provided from the vendor's perspective. Neither publication provides an overview of the general characteristics and capabilities of development management systems. The American Planning Association (APA) recently published a *Planning Advisory Service Memo* entitled "Permit-Tracking Software: What Planners Need to Know" (Bain, 1999), which provides a brief introduction to development management systems. This report seeks to provide a more in depth overview.



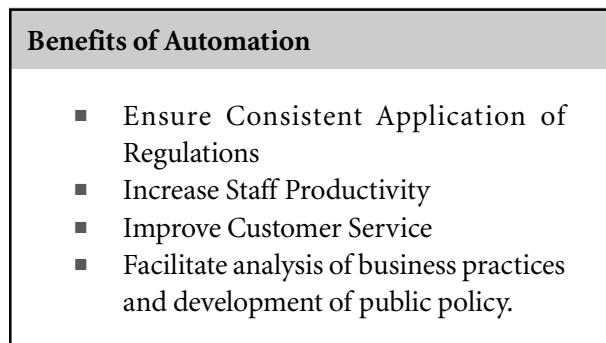
CHAPTER I

Benefits of Development Management Systems

Agencies often implement development management systems with the hope of improving their staff productivity. An agency may typically be striving to serve an increasing number of customers with the same staff resources. Increased productivity can be the direct result of automation, for example when a system can reduce the time required to take in a permit application by providing efficient data entry tools. However, as is often the case with technology, implementing a development management system is just as likely to increase the expected level of service as it is likely to make it easier to provide the same level of service.

First, and perhaps most importantly, implementing a development management system should help an agency ensure the consistent application and enforcement of its regulations. A development management system will integrate all of an agency's processes – permits, inspections, approvals – into a unified system. The system should minimize the chance for errors or miscommunications between staff involved in the various review processes and also ensure that required sequential processes are followed and that no required actions are inadvertently overlooked.

Figure II



Beyond ensuring that regulations are consistently and fairly enforced, a public agency has a responsibility to provide high quality customer service, be the customer a regulated individual, an elected official, or a member of the public. Development management systems can help ensure customers, in the case of those subject to regulation, are treated as fairly and expediently as possible by ensuring all required staff actions proceed in sequence and on schedule.

These systems help improve customer service by providing front counter and telephone staff with a single source for parcel and permit information. These systems can make it much easier for staff to

determine the status of a permit without referring to paper files and making numerous phone calls. Many development management system vendors are developing tools to provide applicants and the public with direct access to permit and property information through alternative means such as telephone, fax, and the Internet. Government agencies need to be cautious in expecting many members of the public to obtain information from automated systems. In industries such as banking, the public has expressed clear dissatisfaction with not being able to “talk to a person”. But to the extent that technology can provide more convenient access, for example by providing 24-hour access to permit information, development management systems will improve customer service.

Development management systems also facilitate analysis of agency activities for operations and policy purposes. Systems can be a valuable tool for managing staff resources. Systems can also serve as a tool for analyzing a community’s land use and development patterns. For example, an agency can compare plat records and building permit records to compile reports on lot availability and absorption rates. This potential is greatly expanded if the system is linked to a Geographic Information System (GIS). In this way an agency can easily prepare maps showing the location of available lots or variations in absorption rates by subdivision.

GIS can also be a tool for analyzing the business activities of an organization. For example, code enforcement actions may reveal an unexpected spatial pattern when mapped. On the operational side, this information could be utilized by the agency to manage inspections. On the policy side, this information could be utilized by the agency to direct community development division residential rehabilitation programs at the most critical neighborhoods.

Finally, a development management system should increase staff productivity. A system should have a direct impact on productivity by decreasing the staff

time spent on activities such as data entry, completing application paperwork, searching for historic records, researching property questions, and generating summary reports.

But agencies should be prepared for a system to actually decrease productivity for some specific, narrowly defined tasks. For example, a non-automated field inspection program, where hand written field notes and signed permit cards are the only inspection records, may be very efficient in terms of maximizing the amount of time inspectors spend doing inspections and minimizing the amount of time inspectors spend doing paperwork. Implementing a development management system that requires inspectors or other office staff to enter inspection results into the computer may decrease the direct efficiency. The benefits may be less direct such as system generated inspection requests ensuring that no inspections are missed, or the ability to quickly access inspection histories to verify that all inspections have been conducted prior to issuing the certificate of occupancy.

A development management system does not guarantee an agency will achieve any of these benefits. Care must be taken in selecting and implementing the system. System implementation should be viewed as an opportunity to review and modify the agency’s procedures so that bad business practices are not automated. Rather than just applying new technology to the same practice, the agency should consider revising its operations to make optimum use of the technology available.

A system will not achieve the desired benefits if it does not receive broad support throughout the agency. Staff from all departmental groups and at all levels in the agency should be involved in developing the specifications, selecting, and implementing the system. Only in this way can managers ensure that the system will meet all of the agency’s need and that agency staff understand and appreciate the system.



CHAPTER II

Development Management System Industry

The development management system field is relatively immature. As can be expected in any rapidly evolving technology, the industry is experiencing vendor turnover, mergers, and acquisitions. The industry is characterized by a large number of small firms with no firm dominating the market. The number of firms is growing and most of the firms are relatively young. The International City/County Management Association's *Software Reference Guide 1998* (Ulrich, 1998) listed 25 vendors of development management systems. All but two of these vendors were new since the 1990 publication of the guide. Put another way, only two firms listed in the 1990 guide, Sierra Computer Systems, Inc. and Diversified Software Systems, Inc. remained in the 1998 guide. Appendix A contains a listing of system vendors with contact information.

Many of the industry leaders, including firms such as Sierra Computer Systems and Tidemark Computer Systems, specialize solely in development management systems. Other firms have evolved into these systems from other municipally oriented product lines. Hansen Information Technologies, for example, became involved in development management systems based on its extensive experience in asset management systems. HTE

entered the development management field from its experience in the finance and budgetary accounting software field.

Firms specializing solely in development management systems have a commitment to the industry and a focus that other vendors may lack. Vendors with more extensive product lines may exhibit more resilience in the marketplace and be less likely to fail. These firms also offer local governments a chance to develop enterprise-wide solutions to database management and customer service.

Vendors with multiple local government product lines tend to sell them in modules. This makes it possible for a government to purchase the firm's development management module and later purchase the firm's asset management or taxation modules. Of course, the acquisition process may also proceed in the other direction. The records maintained and transactions recorded by a local government's planning, building, or code enforcement department may not compare in volume to the databases maintained by the organization's taxation, recorder, clerk, or accounting departments. In many counties and municipalities these functions have already been

automated. In such situations, planning, building, and code enforcement departments should consider using the same vendor for their development management systems. Implementing an additional module within a vendor's product line can have significantly reduced costs for software licensing, implementation, maintenance, and system administration. It will also facilitate development of enterprise-wide data management solutions.

Many development management system vendors are exhibiting rapid growth in terms of customer base, sales, and employment. This type of growth can cause firms to have difficulties providing customer service and technical support. Local governments considering purchasing a vendor's software should consider the experience of the vendor's proposed implementation team as well as the vendor's standards for providing on-going technical support.



CHAPTER III

Types of Development Management Systems

Development management systems can be divided into groups using several criteria.

The first grouping is standard “turnkey” applications versus custom programmed applications. Standard applications are developed by a vendor and then made available to multiple customers through a licensing agreement. In this way standard applications are similar to common shrink-wrapped software programs. However, because development management systems are complex, deploying these systems requires more than simply installing the application software. Turnkey applications are generally purchased along with a package of services that includes installing and configuring the software, set-up, data conversion, and other tasks. However, with these software products, the application code (computer program) is not modified during the implementation process.

Custom applications are those that are developed specifically for a particular agency. These systems can be programmed by in-house staff or by consulting firms. If the program is developed by a consulting firm, the firm is usually required to provide the contracting agency exclusive rights to the software program. However, the developer may retain rights to the

computer program and resell it to other customers as a semi-custom program or even market the program as a turnkey application. In some cases local governments that have developed custom applications have made it available to other agencies. For example, Loudoun County, Virginia, made its Comprehensive Land Application Management System (CLAM) system available to other governments.

Development management systems can also be characterized by the type of platform (i.e., the computer hardware and operating systems) they utilize, although many systems have been developed to work on multiple platforms. Development management systems, including both standard applications and custom programs, can run on mainframe and mini computers. Older systems running on these platforms are accessed with either dumb terminals or personal computers running terminal emulation software. All data processing in these legacy systems occurs on the mainframe or mini computer.

Mainframes continue to provide the data processing backbone for many units of local government. Legacy systems are still commonly utilized in the areas of taxation, accounts receivable, payroll, and court records. Many units of local government also continue

to utilize legacy development management systems. However, newer development management systems on mainframe and mini computer platforms can utilize client/server architecture, which is further discussed below. Vendors that market land development management systems for mainframe and mini computers include Aztek Technologies, HTE, and KIVA.

UNIX is another computer operating system utilized for development management systems. UNIX computers are not as common in local government as mainframe and mini computers, however, UNIX is frequently utilized for Geographic Information Systems (GIS). For this reason UNIX systems may be more often found in planning departments than other local government agencies. Like the mainframe and mini computer systems, older UNIX applications relied on the central processor to provide all computing and users access these systems using either dumb terminals or PCs running emulation software. However, newer development management systems on these platforms can utilize client/server architecture. Vendors that market land development management systems for UNIX computers include KIVA, OpenData Systems, and Eden Systems.

Development management systems have also been developed to utilize IBM-compatible personal computers (PCs) and all of the various PC operating systems. Older systems were designed for use with DOS and some agencies continue to utilize these systems. The majority of new PC based systems now utilize Microsoft Windows operating systems, including Microsoft Windows NT.

Many modern development management systems are designed with a client/server architecture. This allows the agency to utilize personal computers as the desktop “clients” while the “server” can be any type of hardware including mainframe and mini computers, UNIX systems, and IBM-compatible personal computers. This design has the benefit of dividing the processing workload between the backend server and

the individual user’s client computer. This eliminates the need for extremely large processor capacity, increases efficiency, and decreases network traffic.

The core component of development management systems is the database where records regarding the agency’s activities, as well as other records such a parcel information, are maintained. Older development management systems store data in a file structure within the system, such as VSAM files for example. The majority of modern systems are designed to utilize common relational database management systems (RDBMS) such as Microsoft Access, Microsoft SQL Server, Oracle, Sybase, Informix, and Ingress. Microsoft Access is popular with many agencies because it is relatively simple to administer. Microsoft SQL Server is a midlevel database. Oracle, Sybase, and Ingress are high-end databases that require a higher level of system administration skills to maintain.

Because of the Open Database Connectivity (ODBC) standards that have been adopted by the computer industry, many development management systems will work with a variety of database programs. Before purchasing a development management system, however, an agency should ensure that the vendor has prior experience using its system with the agency’s database including both the specific release and service pack. Ideally the development management system should be formally certified as being database compliant.

The remainder of this report provides a review of the features and functions provided by shrink-wrapped development management systems. Given the growth in the number of standard applications available, the flexibility of these systems, and the large overhead associated with developing and maintaining custom applications, local governments should consider turnkey systems carefully before opting for a custom programmed application. The types of systems considered within this monograph operate, at least on the client side, on IBM-compatible personal computers and utilize standard relational database management systems.



CHAPTER IV

Basic System Features

This section describes the basic features found in development management systems. Throughout this section, emphasis is placed on the ability of these systems to incorporate an individual agency's specific business processes with flexible database attribute definitions, processing rules, graphical interfaces, reports, and printed forms.

Data Management

The core of the development management system is a database that stores the agency's records. As previously mentioned, the majority of modern development management systems are designed as front-ends that work in conjunction with an industry standard relational database management system (RDBMS) such as Microsoft SQL Server or Oracle.

Development management systems typically allow users to store information about activities, parcels, and applicants. These categories do not relate to the database structure or number of tables maintained by the system. To create a fully normalized database, the typical system implementation may result in tens or even hundreds of different tables. However, with the interface and query tools provided by the development management system, the table structure is transparent

to system users. These three categories refer to the broadest level of data maintained in the system.

Activities, in this context, are any processes that the agency conducts that need to be recorded and managed. Examples of activities in a planning department include subdivision approvals, rezoning applications, conditional use permits, and variances. Examples of activities in a building department include building permits (electrical, plumbing, combined, etc.) and demolition permits. The type of information that must be recorded for each activity varies by type. The major systems have the flexibility to allow different attributes to be recorded for each activity. For example, a subdivision approval activity can have a "number of lots" data field, while a plumbing permit activity can have a "number of fixtures" data field.

Parcels, or real estate property records, are the second type of information maintained in development management systems. The major systems have the flexibility to allow agencies to determine the exact parcel attribute information to be maintained. Examples of information that is typically included for parcels include: tax identification number, address, subdivision block and lot or an abbreviated legal

description, owner name, acreage, and parcel genealogy or split history. Where possible, parcel records are typically created and periodically updated from the tax assessment land records maintained by county governments.

Some system vendors and implementation sites create an entire table-based “land information system” within the development management system. Such a system facilitates the development review process by providing all the necessary parcel information within the system. Examples of the type of information that might be included are as follows: Zoning District(s), Floodplain District(s), Flood of Record, Wetland Type(s), Soil type(s), School District, Utility Districts, Fire District, Lot Dimensions, Occupancy Type, and Adjacent Street Types.

Much of this data is inherently spatial with a geography that does not correspond to parcel boundaries; this applies to environmental data in particular. It may not do a building permit reviewer any good to know that there is floodplain “Zone A” on the property without knowing the location of the floodplain relative to the proposed structure. At best, having this limited information in the system will serve as a flag to the user that he or she needs to check other sources of information. It will not be a replacement for the other data sources such as floodplain and wetland maps.

Maintaining extensive land information in the parcel database is labor intensive. Every time a parcel is divided, each attribute must be identified and recorded for each of the new parcels. The same is true if a map is revised. For example, if the Federal Emergency Management Agency revises a floodplain map, the development management system administrator will need to identify each of the impacted parcels and enter the new flood zone information into the system.

An alternative approach to managing this type of land information is development of comprehensive “land information systems” based on Geographic

Information Systems. This approach allows the spatial distribution of the phenomenon across the parcel to be discerned. Many permit systems provide the capability to display GIS data directly or to link with GIS software programs. This feature will be discussed later in this paper.

Each agency needs to decide how extensive a list of parcel attribute data it wants to maintain based on its own specific needs. The database component of the current genera of development management systems allows considerable flexibility.

Applicant’s, such as property owners, developers, building contractors, are the third type of information typically maintained in development management systems. Maintaining people records as a separate data type, rather than as attributes of activities and parcels, facilitates normalization of the database. It also enhances reporting capabilities and facilitates the application process by allowing applicant and owner information to be selected from the database rather than key-entered on each permit.

The relational database model allows activity, parcel, and applicant data to be linked to define a specific permit, inspection, or approval. The relational database model supports many-to-many relationships. Therefore, an activity, such as a building permit, can be related to multiple parcels and each parcel can be related multiple owners. In an actual development management system implementation, the three entities could be divided across tens or even hundreds of tables. For example, addresses may be broken out to separate tables from parcels and people. This makes it possible for a parcel to have multiple addresses, as in the case of a shopping center, or for a single street address to have multiple parcels, as in the case of a home on a double lot.

Reports consist of a database query, for example *select all open electrical permits*, and a means of organizing that data for display either on screen or in printed format. All vendors provide tools for querying the database and for generating both standard and ad hoc reports.

Some vendors provide their own report writing tools, while other vendors integrate third-party report writing applications, such as Seagate Crystal Reports, into their application. Because the report design tools of some development management systems provide less than the desired level of functionality, some agencies resort to utilizing a separate software program as a stand-alone application for generating reports. This is less desirable than a system that provides adequate reporting tools or integrates the third-party report application into the system.

A development management system does not eliminate the need for paper documents such as printed application forms, building permit cards, certificates of occupancy, and even payment receipts. These forms as well as violation letters, public hearing notices, and other correspondences can all be designed as report templates that draw relevant factual information out of the database.

Fees and Cash Management

Development management systems have the ability to calculate permit and other fees based on process management rules. The systems provide cash receipting and print customer receipts for fees paid at the counter. Many vendors provide Accounts Receivable programs, either as part of the base system or as a separate software module, that generate customer invoices, manage customer accounts, and generate daily balance sheets and general ledger reports. Some vendors even offer interfaces to digital cash drawers.

Indexing Documents

Most systems provide the ability to store documents within the application; such as word-processing and CAD files, in addition to graphics images, such as TIFF or BMP files. Systems typically provide the ability to view the graphic images directly, but separate application software is required to view or manipulate application files such as CAD drawings. The ability to store images and application files within the development management system provides a convenient tool for tracking the various pictures, letters, reports, and files associated with a case.



CHAPTER V

Advanced System Functions

The preceding chapter provided a description of features found in many turnkey development management systems. This section focus on advanced system features that integrate these systems with additional automation technologies, specifically Geographic Information Systems, field automation, and electronic communication technology. It is through this type of integration that these systems offer the greatest potential to improve customer service and staff productivity. Many municipalities that either have existing development management systems or that plan to implement systems in the near future express a great deal of interest in these areas. Many vendors indicate they are able to deliver these functions, but there are relatively few mature implementations for agencies to look to as examples.

Geographic Information Systems

Vendors have adopted two different strategies towards the incorporation of Geographic Information Systems (GIS) into development management systems. Certain vendors, such as Eden Systems, have adopted a strategy of tightly integrating the geographic and relational databases. The Eden system provides tools for displaying geographic data directly

within its user interface. The embedded GIS viewer has been developed using Environmental Systems Research Institute's (ESRI) Map Objects. The GIS viewer can display geographic data in either ESRI Arc/Info coverage or ArcView shapefile formats. This approach eliminates the need for third-party application software for viewing geographic information. However, separate GIS software is required to perform geographical analysis and to create and edit geographic information, as these tools are not provided within the development management system. In the future more development management system vendors can be expected to adopt this approach to GIS and the sophistication of the tools can be expected to increase.

The majority of vendors that utilize GIS technology have a more casual approach. Permit and geographic data are transferred between the development management system and GIS application without any attempt to normalize the data sources. An example of this is in systems developed by Sierra Computer Systems, Govern Software, and Hansen Information Technologies. Here, when the user is viewing a permit that is associated with one or more parcels, the user has the ability to click on a GIS button that will launch a third-party GIS application, such as ESRI's ArcView

or Intergraph Corporation's MGE, thereby passing it the parcel identification number. This causes the application to open with the map theme zoomed to the appropriate geographic area. Hansen Information Technologies also provides the ability to embed certain tools within the ArcView interface. These tools allow users to view and map permit information from within the GIS application. However, the user needs to return to the development management system to initiate or act on a permit.

Field Automation

Relatively few municipal planning, building, and code enforcement agencies have automated their field inspection process. However, many agencies are interested in using technology as a way to improve the consistency and productivity of inspection activities. Automating field inspections requires the ability for field staff to receive inspection requests; view existing property, permit, and inspection information and history; record inspection results; and transfer results back to the main development management system.

Field automation can make use of different types of hardware and software. Hardware options include laptop computers, pen computers, and MS Windows CE computing devices. Each of these options has separate strengths and weaknesses. Use of standard laptops provides the greatest potential for providing a fully functional development management system in the field. Laptops are recommended for use by development system vendors that use their standard application, against a stand-alone database, for field automation. Development management system vendors that provide field inspection software modules and vendors that specialize solely in field systems can also utilize laptops in the field. On the negative side, most laptops are not designed for use outdoors exposed to the weather and rough handling. Also, it is difficult to enter data on a laptop while conducting an inspection.

Pen computers utilize the same microprocessors as laptops, but have a touch sensitive screen similar to computer kiosks, rather than a keyboard, that allows data to be entered through the use of a stylus. Text can be entered by "typing" on an on-screen virtual "keyboard". These computers are designed specifically for outdoor use and may hold up better against rough handling. These computers make it easier to record inspection results while standing and also make it possible to record sketches and signatures. On the negative side, it can be difficult to enter extensive text using the virtual keyboard and many of the field inspection systems designed for these computers provide limited functionality compared to the office systems.

Finally, at least one field software system vendor has designed a system for use on Microsoft Windows CE computing devices. These devices have the benefit of being low cost and extremely portable. However, the applications are necessarily relatively limited given the modest capabilities of the CE computer devices.

Beyond the hardware utilized, development management system vendors utilize at least three different approaches for field automation. Some vendors approach field automation by utilizing the database replication tools of the underlying RDBMS. A stand-alone copy of the development management system application is utilized with a stand-alone version of the database application with the replicated data on a laptop computer. Other development management system vendors utilize third-party inspection software for field automation. An example of this type of software is the InspecTrack system developed by M-Track Software. Finally, some development management system vendors, such as Hansen Information Technologies, provided specific field inspection modules and tools for transferring data back-and-forth between the office system to the field computers. This approach offers the best opportunity for the seamless integration of office and field activities.

Using separate office and field systems results in duplicate effort. This approach requires the agency to implement and continually maintain and synchronize two database servers. In addition to duplicate databases, the agency must also synchronize the screens and forms utilized by the two systems. For example, every time a change is made in the office system (a permit is modified, an inspection type is added) a corresponding change needs to be made in the field system. If an agency adopts this dual system approach, it is essential that responsibility for ensuring that the two systems reliably transfer data is firmly established with either the development management system vendor or the field software vendor.

Transferring data between field devices and central office development management systems requires making a physical connection. This can be accomplished with a direct network connection in the morning or afternoon when inspectors are in the office. As an alternative the systems can be synchronized using Internet connections or dial-up modems. However, such connections may be too slow to be practical particularly for agencies that want inspectors to have large amounts of permit, inspection, and parcel data available to them in the field. In the future live connections between inspectors in the field and development management systems in the office will be possible using digital modems or radio frequency connections. However, while many vendors talk about these possibilities, the technology is only beginning to be applied for use.

Remote Access Customer Service

Perhaps the biggest area of interest within planning, building, and code enforcement departments is in the ability to provide remote access to development management system data and functions using telephones and computers. The intention is to provide customers the same convenient access to permit information as they currently enjoy, for example, with pharmacies, banks, and other financial institutions.

One particular benefit of this automation is the ability to provide 24-hour access to information and services.

Remote access using the telephone can be used by the public to request application forms and standardized information (fax-back systems), for contractors to schedule inspections, and for applicants to check on the status of permits. Telephone based remote access requires interfacing the development management system with an Interactive Voice Response (IVR) system. Several development management system vendors have preprogrammed modules designed to allow their product to interface with specified IVR systems. Other development management system vendors leave it to the agency to have the interface connection programmed by the IVR vendor.

Computer access, through the Internet or dial-up access, can be utilized for the same purposes as telephone access. Additionally, computer access can include the ability to apply for permits. Many of the best examples of providing on-line customer service have resulted from the Smart Valley, Inc. project known as the "Smart Permits Initiative." As a result of this initiative, the City of Palo Alto, CA has fully implemented Internet permitting. The city allows builders and property owners to register, using the Internet, to be able to apply for building permits via the Internet. The city also allows permit status to be checked on the Internet. Another example of Internet permitting to come out of the Smart Permits Initiative is the City of San Carlos. The City currently allows the public to check on the status of permits and comment on development proposals via the Internet. The city plans to begin accepting permit applications via the Internet in the Fall of 1999.

Providing Internet based remote access requires developing a web-browser interface. While several vendors sell standard Internet connection modules, other vendors treat this as a custom programming application.



CHAPTER VI

Implementation

Implementation of even a turnkey development management system involves much more than installing the application software. Implementation for a moderate sized organization may take six months to a year, or more. Typical implementation steps are listed in Figure IV. The order of these tasks may vary depending on the vendor.

The first step in the implementation process typically involves the agency reviewing its business rules with the system vendor. Many vendors provide the agency with a standard form that must be completed for every permit, review, inspection, etc., to be incorporated into the system. These forms provide the information to define each activity's process, fees, and conditions. It is during this phase that the agency can and should identify less than optimal business processes and modify its procedures accordingly. Experienced vendors will be able to make suggestions on how an agency might adjust its business practices based on other jurisdictions they have automated. But the majority of system vendors are not business management consultants.

Ideally, the process of documenting business practices should begin well before a system is selected. Building and development review processes are often

Figure IV

Typical Implementation Tasks

- Process Review
- Software Installation and Testing
- Activities Setup
- Data Conversion
- Forms and Reports Design
- Training
- Go Live

exceptionally complex. Staff members in different work-groups frequently disagree about what does or does not occur in the process, as well as about the purpose of certain procedures. It is essential that agencies do a thorough and careful job of documenting their business processes before they attempt to automate. The staff time required to prepare workflow diagrams and descriptions should not be underestimated. Failure to give adequate attention to this task is certain to result in costly re-programming of the development management system when it later fails to perform as expected.

The next implementation step is often to install the application software and database software and any

other required hardware or software. The entire system is then tested on the agency's hardware and network environment.

Following the installation and testing of the system, it is possible to begin the activities set-up. Many vendors provide generic activity templates, such as building permit, planning application, and code enforcement action, which are modified to match the agency's processes. This task requires coding in each of the agency's workflow, fee calculations, data items, reviews, and conditions.

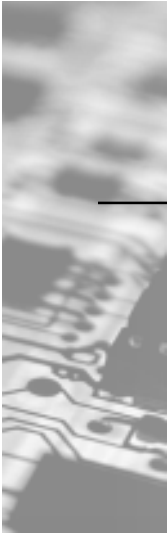
Once all of the agency's activities are defined, data can be converted to the new system. This step will likely begin much earlier with the careful review and clean-up (also known as "scrubbing") of existing data, as necessary. However, data conversion generally cannot be completed until each activity has been defined in the new system, as activities help determine the required database tables and items. For agencies converting from older systems, data conversion can be the most complex, time consuming, and costly implementation step. But even agencies implementing their first development management system will likely want to populate the system with parcel information from existing tax records or other sources.

Once the activities and data structure are defined, it is possible to also begin defining the standard forms and reports that will be generated by the system. These include items such as application forms, permit cards, certificates of occupancy, and cash receipts, as well as the activity, revenue, and management reports that will be used by the agency's administrators.

The final implementation step is training of end users. Because this type of knowledge will be quickly forgotten if not utilized, end user training should occur as close to the go-live date as possible.

As already stated, the order of the implementation steps may vary between vendors. However, regardless of how implementation proceeds, each step in the process must be carefully tested to ensure the entire system will function properly.

The division of responsibility for each implementation task between the vendor and the agency will also vary based on the system being implemented, technical skills available in the agency, and the final negotiated scope of services. Agencies should pay particular attention to assignment of responsibilities for the activities set-up and data conversion tasks. Some vendors train the agency's system administrators to do the activities set-up, some vendors do the activities set-up, and some vendors offer the agency a choice of who does the set-up. The difference can result in hundreds of man-hours of effort for one party or the other. Likewise, some vendors assume responsibility for all data conversion while other vendors require the agency to convert its data to a predefined file (table and field) structure to be imported to the development management system. Again the difference can result in hundreds of man-hours of effort for one party or the other. When purchasing a system, an agency should ensure the contract agreement specifically states who is the responsible party for each implementation task.



CHAPTER VII

Conclusion

Implementation of a development management system can help an agency to increase staff productivity, improve customer service, ensure the fair and consistent application of development regulations, and improve its analytical capabilities to support both management and policy analysis. However, these benefits are not guaranteed and do not occur without considerable effort.

An agency must first analyze its needs and select the system that best meets its particular requirements. Part of determining what an agency wants in a system requires understanding what is available. This report has sought to provide this background information. However, development management systems, like all computer technology, are rapidly evolving. The information contained in this report will become quickly outdated. Agencies planning to implement systems should visit existing installations and attend vendor demonstrations at professional conferences and other venues. Seeing systems in use,

even on sample data, is important to understanding if and how they can facilitate an organization's business processes.

A broad cross-section of departmental staff should be involved in developing the specifications and selecting the system. Only in this way can managers ensure that the system will meet the agency's need and that agency staff understand and appreciate the system. Beyond carefully analyzing agency needs and selecting the best system for the application, agencies need to devote adequate resources to system configuration and setup. Turnkey development management systems have a detailed implementation process that will typically extend six months to a year and require extensive involvement by agency staff. Agencies should be willing to review their existing business practices with an open mind and revise processes to make better use of available technology as appropriate.



APPENDIX A

DEVELOPMENT MANAGEMENT SYSTEM VENDORS

Sources: *ICMA Software Reference Guide 1998* (Ulrich, 1998)

This guide has full descriptions of each software product.

“Planning Software Survey 1990” (Hecimovich and Schwab, 1990)

System Vendors

Vendor Name	System Name(s)	Contact Information
Alan Harding & Associates	Building Department Management System	5731 Blinnton Pl. Columbus, OH 43235-7205 (888) 442-0024
American Data Group	Building Permits and Licenses	7853 E. Arapahoe Ct., #3000 Englewood, Co 80112-1377 (303) 741-5711
Aztek Technologies Inc.	ResponseWare Permitting/Inspecting	450-6450 Roberts St. Burnaby, B C, Canada V5G 4E1 (604) 473-9505; (250) 762-2333
Black Bear Systems, Inc.	PTWin	PO Box 280 Chimacum, WA 98325 (360) 379-9750
BOCA International, Inc.	Complete Building Dept.; Property Maintenance Management System	4051 W. Flossmoor Rd. Country Club Hills, IL 60478-5795 (708) 799-2300 Ext. 349

Vendor Name	System Name(s)	Contact Information
Cordes Data Systems	LandBase	27-751 Rawlings Rd. Hemet, CA 92544 (909) 658-6896
Des Lauriers & Associates, Inc.	GeoTMS – Geographic Town Management Systems (508) 668-4512	130 West St. Walpole, MA 02081
Diversified Software Systems Inc.	Comply; Comply II; Cornerstone	1211 Semoran Blvd. Suite 221 Casselberry, FL 32707 (407) 657-1440
Eden Systems, Inc.	InForm Gold	507 Industry Dr. Seattle, WA 98188 (206) 575-6202
Franklin Information Systems	BDS/FIS; Housing/FIS; Field Inspections	5108 South State Rte 123 Morrow, OH 45152 (513) 899-3029
Gartek	Integrated Land Management System	300 31st St., N. Suite 526 St. Petersburg, FL 33713 (813) 321-0202
Hansen Information Technologies	Version 7 for land management	1745 Markston Road Sacramento, CA 5825
HTE	Community Services Solutions	1000 Business Center Dr. Lake Mary, FL 32746 (800) 727-8088
Integrated Information Systems, Inc. Systems, Inc.	CityCode	1560 W. Fountainhead Pkwy. #200 Tempe, AZ 85282 (800) 216-7648; (602) 966-8800
KIVA	KIVA Permits, Licensing, and Inspection Systems	5525 South 900 East Suite 325 Salt Lake City, UT 84117 (801) 261-2617
Lindenwald Corporation	Building Permit and Inspection System for DOS	P.O. Box 187 Savage, MN 55378-0187 (612) 894-5694

Vendor Name	System Name(s)	Contact Information
M.D.M. Advanced Systems	AdvanTrack	28465 U.S. 19 North, #200 Clearwater, FL 33761 (813) 791-8224
Micro Science, Inc.	Building Permit Tracking System	P.O. Box 36539 Grosse Pointe Farms, MI 48236-0539 (313) 881-0950
Municipal Software Library	MSL Land Development – Subdivision Tracking	310 Exton Commons Exton, PA 19341 (610) 524-0339
OpenData Systems	OpenData Systems Series	5900 Hollis St., Suite G Emeryville, CA 94608 (510) 655-6022
Sierra Computer Systems, Inc.	Permits Plus	1731 West Walnut Ave. Visalia, CA 93277 (559) 627-1959
Southern Building Code Congress	Standard Soft Code Enforcement, Building Code, Permit modules	900 Montclair Rd. Birmingham, AL 35213 (205) 591-1853
Systems Consultants, Inc.	Permits & Inspections	121 Hunter Ave. Suite 100 St. Louis, MO 63124 (314) 683-0262 Ext. 345
Tidemark Computer Systems, Inc.	Permit*Plan	201 Queen Anne Ave. North Suite 401 Seattle, WA 98109-4828 (206) 284-8438
TR Systems	PermitWorks	4810 White Bear Pkwy. White Bear Lake, MN 55110 (800) 426-7030; (612) 426-7000
TreSun Corporation	Encompass	9050 Pines Blvd. Suite 270 Pembroke Pines, FL 33204 (954) 433-2801
WindoWare! Inc.	Permit-IT!	219 Windsor Castle Dr. Suite W Newport News, VA 23608-1823 (800) 577-9374

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Ulrich, Christine (Editor), 1998, *Software Reference Guide 1998*, International City/County Management Association, Washington, D.C. For more information call: (202) 962-3595

Ulrich, Christine (Editor), 1990, *Software Reference Guide 1990*, International City/County Management Association, Washington, D.C. For more information call: (202) 962-3595