

Production, Analysis and Publication A Concept for Geographic Information Environments

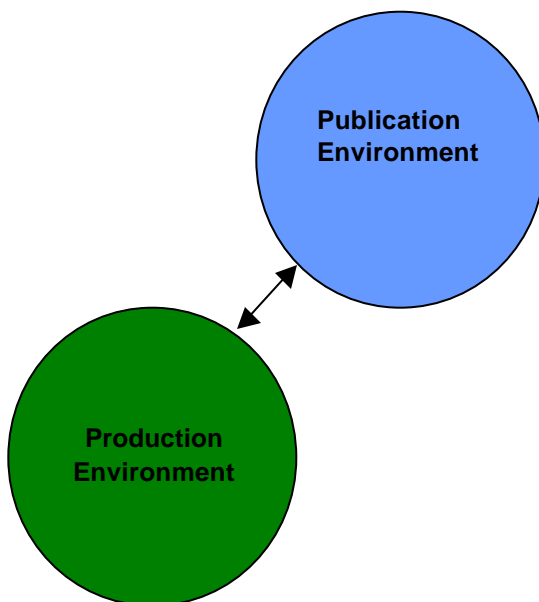
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1. Introduction

As geographic information system (GIS) data sets become larger and more integrated and as the GIS becomes a more integral part of an agency or a department's operations, it is increasingly important to understand and describe the environment or conditions for the GIS data and associated GIS software. This means understanding where and by whom data updates will occur, how will value added information be linked to the GIS data, and what software will be needed to support the GIS data and applications.

There are many information technology analysis tools and diagrams to study and analyze data maintenance and consumption from a technical point of view. This paper looks at simplifying that analysis into three core environments. Each environment is characterized by what happens to the data and what level of software is needed for applications using the data. This taxonomy provides a common language for describing a set of conditions that exist in all GIS organizations.



The basic taxonomy is two highly interrelated but separate environments. The production environment is the maintenance of databases, maps and production of information products. The publication environment is the distribution and publication of maintained GIS data to users outside the data production or data maintenance community.

In short hand, if the data is changing it is in a production environment. If it is being distributed or published for others to use it is a publication environment. One department's published information can become anthers production information. For example land surveyors may produce highly accurate adjusted coordinate values that are published or made available to parcel

mapper who incorporate this published information into their parcel map production environment,

This paper describes these two environments and why this taxonomy is important for GIS implementation.

2. Production Environment

The production environment is the production and maintenance component for geographic information. This is the environment where data custodians update, add, edit and manage versions of their information. This is the environment for the internal maintenance staff with heavy-duty data management tools and software. Often information in the production environment is under various stages of construction. For example, attributes related to a parcel ownership transaction might be processed before images of the transaction documents are connected to those attributes.

Geographic Production Environment

- Used by Data Producers and Data Custodians
- Connects to and Manages Currently Maintained Data
- Transaction Updates and Linkages to Data as it Changes

Figure 2 - Production Environment Characteristics

In the production environment transactional information might be captured before the spatial extent is mapped or the mapping might be done with related attributes and images added to mapped features. The features in the production environment are in the maintenance cycle. They may be part of long or short transactions and may be at any stage in the maintenance cycle. For example, the parcel maintenance cycle be to receive a deed from the Register of Deeds Office, map the parcel geometry changes, add a new parcel number, update the assessment, value and ownership information and then post the former parcel configuration and associated information to an historical parcel file. In this example the maintenance cycle is completed when the historical postings have been completed.

Every jurisdiction will be different in terms of defining when a parcel has completed its maintenance cycle. In some places parcel maps may be made available before the assessment, value and ownership information has been completed. In this case there would be at least two maintenance cycles, one for parcel mapping and historical postings of the map and one for updating associated attributes and the historical posting of attributes.

The frequency of maintenance activities, the organization and length of the maintenance cycle and the determination of "ready to publish" depends on information policies within the jurisdiction.

For the production environment it is sufficient to recognize that there are stages within the GIS maintenance where data custodians are changing information and that the security and permissions to do these changes are controlled by a limited number of identifiable people. If data are published or distributed before it completes its maintenance cycle data synchronization, standardization, quality, security and integrity are at risk.

Table 1 illustrates activities, basic functionality provided by and basic data requirements for a production environment

Table 1 - Examples of Production Environment Activities

Activity	Basic Functionality	Data Produced
Parcel Maintenance	Update parcel transaction information, add and update new geometry	Parcel maps, ownership, assessment and tax rolls, historical parcels, transaction documents
Address Maintenance	Query parcels, update addresses	Site Address, mailing address, contact names
Permit Maintenance	Process new permit applications, track review processes, permit workflow	Permit Information, digital signatures, inspection and compliance updates, enforcement information
Document Maintenance	Maintain transaction documents, indices, and collect fees	Tract index, digital signatures, payment fees, cashing system
Base Data Maintenance	Update base information including geodetic control, least squares analysis, ortho updates and other base features	Survey control, geodetic networks, orthophotography, lidar, terrain information

2. Publication Environment

The publication environment is the consumptive environment. This is the environment where other users access and consume information from data producers or data custodians. The consumer can not change the published data, but they can incorporate it into their own data production processes, query it, add value to it, expand it, make reports, or do any number of analytic or reporting operations.

The data consumer or data user does not change published data. The published information is the result of a known maintenance cycle and is complete information with metadata and associated linkages. The data producer has run quality assurance processes.

Publication Environment

- Used by the general public or e-commerce users
- Retrieves published data for use in other applications
- May be web based or a counter Kiosk or public terminal.
- May be a thick or thin client.

Figure 4 - Publication Environment Characteristics

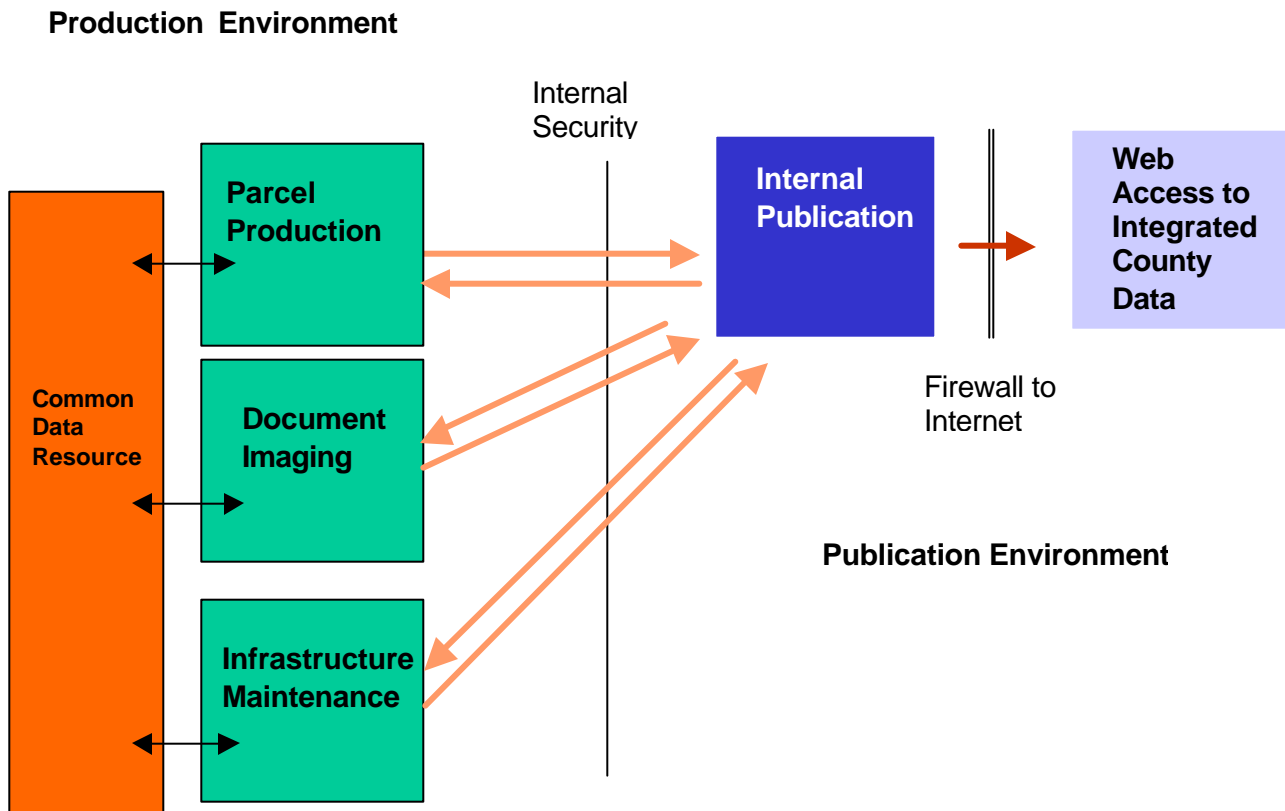
Table 2 - Examples of Publication Environment Activities

Activity	Basic Functionality	Published Data Sets Used
Core Citizen Query	Query parcels - obtain existing parcel specific data	Parcel maps, orthos, ownership, assessment and tax rolls, address, road centerlines, and hydrography.
Land Surveyor Query	Present and past surveys - all records	Remonumentation, survey index, control surveys
Environmental Query	Query an area and return all available resource data, buffers, scenarios	Land Use, Zoning, Wetlands, Floodplains, Soils, Contours, Orthos.
Permit Support	Parcel query, buffers, mailing label generation, permit form pre-completion, submit electronic form of application.	Parcel maps, ownership, tax and assessment rolls, zoning, orthos, resource data, past permits, address
Redistricting / Political Support	Scenarios for new election districts	Census, current geopolitical, Parcels, School Districts, Voting Wards
Document Support	View a document	Tract index, image format requirements, parcel numbers, Imaging Systems
Law Enforcement Support	Use of public access for E911 Purposes	Crime Scenes, Site Address, Road Centerlines, ESN Boundaries, MSAG.

3. The implications of Two Environments

Beyond the basic differences in permissions for data changes, from a data producer's or data custodian's perspective published information presents data that is finished in some aspect of the maintenance cycle. It is data that is no longer in limbo or no longer part of some pending transaction. It is completed. From the data consumer's or data user's perspective the publication environment represents data that is ready for subsequent use. This might be web publishing or internal analysis. As stated before one department's published data may be another production data. Data often flows from one environment to another.

The production environment is connected to a data repository. The concept here is that all data custodians would have the access they need with the proper permissions to view, reference and update data. The data would be maintained through the normal business processes that cause information to be updated and changed.



Production and Publication Environments

The published information would be available to other departments, other agency, the public, subscribers or other users or consumers who can then use the integrated and published information.

The common data resource means that a shared production environment will assure that information is vertically integrated. That is, if a parcel boundary coincidence with an

administrative boundary and road centerline, that all of these features have spatial coincidence. The publication environment contains integrated information that can be relied upon to be consistent.

Conclusion

Understanding and configuring geographic information into the correct environment can help jurisdictions structure their hardware and software requirements to maximize resources. Understanding and developing the information policy for a jurisdiction in terms of production and publication can help clarify data distribution, maintenance and access requirements.