Implementing LADM Using the Parcel Fabric as a Well Architected System

Amir BAR MAOR, The Netherlands and Brent JONES, USA

Key words: LADM, Parcel Fabric, Implementation.

SUMMARY

The Parcel Fabric represents a conformant implementation of the Land Administration Domain Model (LADM), as defined by ISO 19152:2012. Since its release in 2019, it has been adopted by hundreds of organizations globally, supporting a range of deployment models including single-user file geodatabases, enterprise environments with concurrent editing, and an upcoming Software as a Service (SaaS) offering via ArcGIS Online. This paper introduces the concept of a "well-architected system" in the context of cadastral implementations, structured around six foundational pillars: automation, integration, observability, performance and scalability, reliability, and security. These pillars are essential for the successful operationalization of LADM in production environments. Additionally, the paper explores how the Parcel Fabric information model extends beyond the core LADM specification to incorporate advanced capabilities such as parcel lineage, historic parcels, editor tracking, built-in configurable quality rules, and support for repeatable workflows using tasks.

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1. LADM IMPLEMENTAION AS AN IT SYSTEM

Designing any information model cannot be done in isolation from the IT environment it is designed for. Every IT system is made of these key components:

Table 1. IT system key components

Component	Role in IT System
Hardware	Servers, GPS devices, sensors
Software	GIS platforms that can be deployed as SaaS, Server, desktop and mobile
Data	Cadastral data, imagery, geodetic control
People	Analysts, developers, decision-makers
Procedures	Workflows for data collection and analysis

As you can imagine, the above components are true to any IT system. It does not matter if the system uses web editing against a SaaS (Software as a Service) solution or an enterprise system that is deployed on premise.
GIS is considered a specialized IT System because it:

- Integrates with enterprise systems like document management systems, CAMA, ERP platforms to add location intelligence
- Acts as a system of record, engagement, and insight:
  - **System of Record**: Stores authoritative geospatial data
  - **System of Engagement**: Enables collaboration through maps and apps
  - **System of Insight:** Analyzes spatial patterns to support decision-making
- Supports multiple industries: Cadastre, urban planning, environmental science, public health, and more
- Uses spatial databases to manage data with geographic coordinates

When the conceptual LADM is implemented, it is easy to forget about the other IT components above. These components have a direct impact on the physical information model design process.

2. CHANLLENGES IN LADM IMPLEMENTAION

The Land Administration Domain Model (LADM) is an international standard (ISO 19152) designed to provide a conceptual framework for managing land-related information. The complexity of the model and the need to understand UML diagrams makes is challenging to understand. Since LADM is a conceptual information model, it can be challenging to use it to implement a physical information model.
The publication 'LADM in the classroom' helps educators use concrete examples to teach and make LADM more accessible.

Any information model design process requires the designer to have a good understanding of the unique business requirements, workflows, and deliverables the system needs to produce. Finding subject matter experts that understand the LADM information model on the one hand, and understand the business requirements, data and workflows on the other hand can be hard to find.
LADM is designed to capture all 3R (Rights Restrictions, Responsibilities) under the same definition. As a result the definition of a 'Spatial Unit' is very broad. In reality, countries have distinct definitions for a 'parcel', 'easement', 'land use / zoning', ect. Each parcel type has its own unique set of attributes, quality rules, domains (code lists). While LADM makes it easier for experts to communicate using the same ontology, the terminology used is usually very narrow and specific.
As a result of the challenges listed above, implementing country profiles is difficult. Most country profiles are another UML representation of LADM and not a physical information model. They are a conceptual information model that cannot be deployed in a production environment as a physical information model.

3. A 'WELL-ARCHITECTED SYSTEM'

When designing a new system it is critical to take a business-first approach. What does this mean in practice? At its core, this means that architecture should primarily be designed to support specific workflows, business capabilities, or outcomes that the organization needs completed. This demand-driven approach leads to systems that support the primary capabilities first and then grow effectively to increase impact and adoption across an organization.
The term 'Well Architected System' is used as a guidance and promote best practices around six pillars: Automation, Integration, Observability, Performance and Scalability, Reliability, and Security. This framework helps organizations build resilient, capable, and effective cadastral systems by addressing key technical and operational aspects to meet user needs and business goals, see https://architecture.arcgis.com/en/framework/architecture-pillars/introduction.html

3.1 Automation

Cadastral systems typically incorporate many components, inter-dependencies, processes, and workflows. Automation allows organizations to manage these processes and configurations using consistent, repeatable steps, initiated or orchestrated through automation engine, tool or layer. This frees organizations to spend time building new features, capabilities, and experiences rather than completing the same backend workflows, setup procedures or data edits using manual processes. Automation can be done using low code/no code configurable applications, or using scripts and models that automate ETL of cadastral data, quality assurance, and repeatable workflows. With the progress seen with agentic AI, this area is likely to expand in the near future.

3.2 Performance and scalability

Cadastral systems have a have relatively large and mission or business-critical audiences. Both performance (the speed and effectiveness of operations and workflows) and scalability (the system's ability to support multiple concurrent workflows or users) are critical to user experience and efficiency.
Performance can mean many things, from simple request-based metrics like average response time to subtler measurements like user experience quality and workflow completion rates. These can also be subjective targets, depending on user expectations, their experience with a system or application, and their own conditions, such as client machine performance or network connectivity.
The scalability of a system can also be defined in several different ways - some organizations use this term to refer to the default system configuration, and how many users that configuration can scale to. Another definition is related to automatic system scaling in response to load, where increased user or system requests leads to a system scaling either vertically or horizontally. In either case, scalability is subjective to the expected use of the system, and well-architected systems are designed to operate at a reasonable and cost-effective standard scale while supporting the expected growth of use over time.

3.3 Security

Security is an essential consideration for all IT systems, and especially enterprise systems with extensive use across many users or business processes. As many contemporary systems have evolved to rely on Internet-facing service-oriented architectures, the importance of a strong security posture has increased. Well-architected systems consider security requirements and posture from the earliest phases of system design, and aim to balance strong security principles with ease of use and appropriate access to the system.
This architecture pillar provides some guiding considerations related to security, across both on-premises and software-as-a-service applications and ranging from encryption and certificate considerations to integrations with modern security appliances. Note that security standards and requirements vary significantly from one organization to another.
Authentication is the process used to verify credentials to confirm the identity of an application or user that is attempting to connect to a system. Once the identity is confirmed, an authorization process determines if the application or user has permission to access resources like data, maps, or apps.
Once an authentication step has been completed and a user has an access token to the cadastral system, **authorization** and access rules are applied.
Encryption of data in transit is a standard expectation of today's enterprise systems, and most web browsers will default to HTTPS connections to websites and SaaS applications, disallowing use of an unencrypted connection.
The practice of **auditing** and analyzing system and application logs on a regular basis can provide a baseline understanding of use during routine operations.

3.4 Integration

Cadastral systems rarely exist independent of other components, as most have key dependencies on other systems within an organization such as identity management, data

storage, document management systems, Land Registration systems, mass evaluation systems, workflow management systems, and financial systems, to list a few.
A system has to be designed and architected to support the shared goals of easy integration, broad standards-based interoperability, and a robust set of extensibility options across web, desktop, mobile, and server-based patterns. Integration often brings together the capabilities and resources of multiple business information systems to amplify organizational productivity. One way to break integration types into common categories is to describe integration as taking place at three different architectural tiers:

- **Presentation tier or application integration** – This tier is focused on user interaction. Integration at the presentation tier will differ based on the chosen user application type (web, mobile, or desktop).
- **Service-level integration** – The application tier, also, in services-oriented architecture parlance, known as the services tier, is where data are processed and processes are orchestrated.
- **Data-level integration** – The data tier, also referred to as the persistence tier, is where data are managed and stored. Authoritative data stores, databases, file shares, and data pipelines (processes for ingestion, transformation, enrichment, and propagation of digital content) are present in this tier.

3.5 Reliability

All enterprise systems are expected to be reliable, but the definition of this term can vary significantly depending on the use case, business criticality, and integrations that define a system. Though reliability relates to other terms such as business continuity, failure management, resilience, high availability, stability, uptime, fault tolerance or redundancy, this pillar is titled reliability to capture the wide spectrum of definitions that organizations have.
Well-architected systems are designed to reliably provide the capabilities, functionality and workflows that business requirements demand. Reliability is often measured through the concept of a Service-level Agreement (SLA). An SLA refers to a commitment to business users and clients of a system to maintain a level of service at all times.

3.6 Observability

In order to run at a high level of availability or service, and to ensure that any issues can be effectively dealt with, they must be well-understood and transparently observable for engineering and IT staff. Observability is a commonly used IT term to describe the availability of information about the internal workings of a system, such as the compute usage of a database cluster, the storage input/output metrics for a provider, or the number of requests and activity across different apps or services.
The importance of observability supports two related goals of system operations - that the system maintains a steady state that is consistent and stable, and that when issues appear, that supporting teams can quickly respond to the issues and make informed, effective changes to restore the system to an expected state.

4. ENVIRONMENT ISOLATION

Many organizations build IT systems using a multi-environment approach, whether they refer to these systems as development, staging, pre-production, QA, acceptance, or production, these terms are used to designate different environments which have different characteristics and are used for different purposes, see https://architecture.arcgis.com/en/framework/architecture-practices/design-principles/environment-isolation.html.

Users of ArcGIS systems expect the system to be available when they need to do their work. However, significant changes to system configurations can cause downtime if these changes are not safely developed and tested in environments separate from production. Isolating computing environments is an approach to maintaining system reliability and availability by creating separate systems for production, testing, and development activities.

To best maintain system reliability and availability for your users implement isolated production, staging, and development environments.

The **Production** environment is the live system that supports end users. Software, application, configuration, or network changes should generally not be made to a production system without being tested in a staging environment. This environment often has increased monitoring.

A **Staging** environment is generally designed to be a representative mirror of the production environment that lets you vet system changes before deploying those changes to production.

A **Development** system is a workspace where developers and analysts can create and manage content or make changes without impacting a large audience. This dedicated environment is typically used for creating new capabilities such as applications, services, data models, or geoprocessing models, for unit testing, and for designing and constructing business workflows.

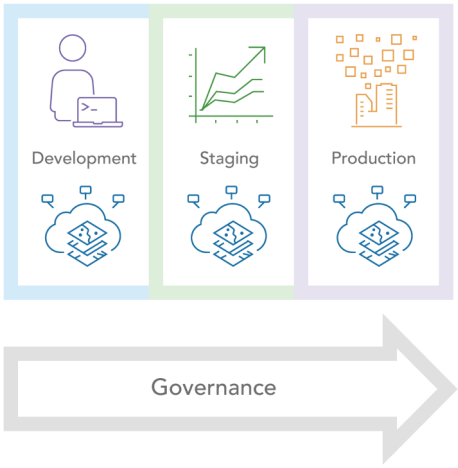

Figure 1. IT Environments

Environment isolation insulates your production environment from known risks and changes that can negatively impact your business, like upgrades, new software, or unexpected changes, helping you better maintain their functionality, stability, and performance. At a

minimum, most organizations should have at least two computing environments: production and staging, as they may not participate in any custom development activities.

5. LADM AND THE PARCEL FABRIC

The current (second) generation of the Parcel Fabric conforms with LADM abstract test suite (level 1-3). Since the parcel fabric is LADM compliant, it is the biggest driver of LADM implementation and adoption.
As of 2025 there are globally more than 500 implementations of the parcel fabric. Here are a few implementations that have been made public:

- The Bureau of Land Management (US) - link
- Ras Al-Khaimah, United Arab Emirates - link
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- Will County, Illinois, US - link
- Harris County Appraisal District, Texas, US – link
- Tooele County, Utah, US - link

One has to keep in mind that the 3Rs and the parties packages are typically implemented as part of a different system. This is usually the land registration system and/or the mass evaluation system (CAMA). The parcel unique identifier is typically used to integrate between the systems.
The parcel fabric provides a comprehensive framework for managing, editing, and sharing parcel data in both a multiuser and single-user environment. In a multiuser environment, the parcel fabric can be edited and maintained using web services and services-based architecture. The flexibility of LADM and the parcel fabric allows organizations to easily configure their information model. This process is typically done as part of the data migration process. Organizations can use LADM terminology if they choose to. LADM has been receiving a growing interest from national cadastral agencies in the past few years. The ease of configuring the parcel fabric makes it easy for cadastral organizations to implement the LADM.

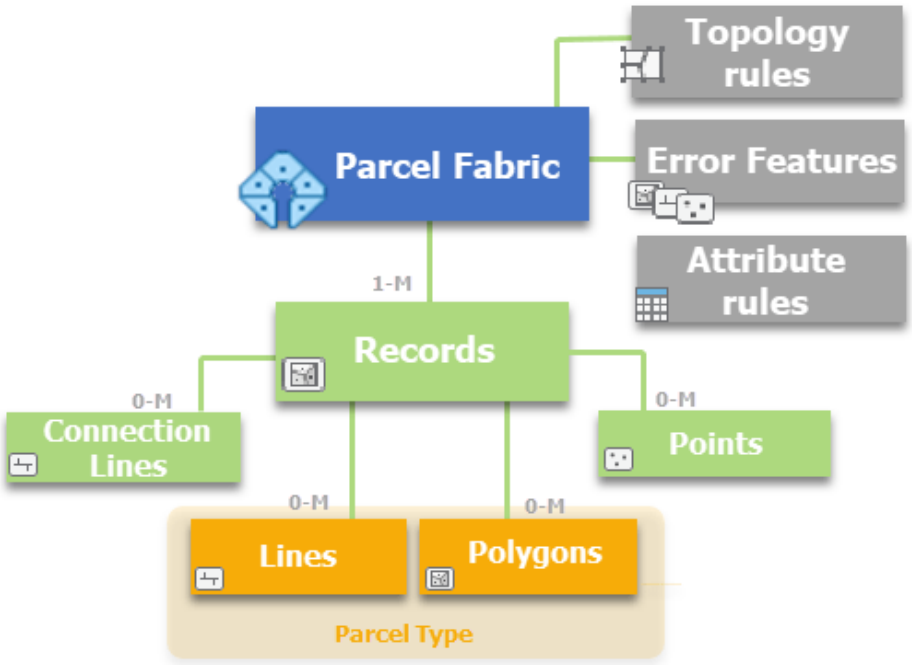

Figure 2. Parcel fabric conceptual information model

5.1 Extending Beyond LADM

The parcel fabric has additional capabilities that go beyond LADM. These capabilities are reflected in the information model. These are the main one:

5.1.1 Quality

The parcel fabric information model includes configurable quality rules. There are 3 engines that are defined as part of the information model:

1. **Geodatabase Topology** - helps manage and enforce spatial relationships among features in a dataset. It is enforced by configuring rules that dictate the allowed relationships. Any rule that is violated will create an error during validation.
2. **Attribute Rules** - allow users to enforce data integrity, automate workflows, and enhance editing experiences within geodatabases. Constraint Rules prevent invalid data from being entered. Validation rules Flag records that don't meet certain criteria but don't block edits. Evaluating validation rules results in error features that persist in the geodatabase.
3. **Least Squares Adjustment** (LSA) - the parcel fabric uses the DynAdjust LSA engine from GeoScience. It is used to run free network adjustment as well as constrained network adjustment. LSA is used to detect blunders, evaluate the spatial accuracy and improve it.

5.1.2 Parcel Lineage

The parcel fabric manages parcel lineage. Parcel lineage is established when parcels, boundaries and points are created or retired by a legal transaction. The legal transaction is called a 'record' and is equivalent to the 'source' concept is LADM. Every feature in the parcel fabric is associated to the record that created it, and once retired, to the record that retired it. This established parcel lineage.

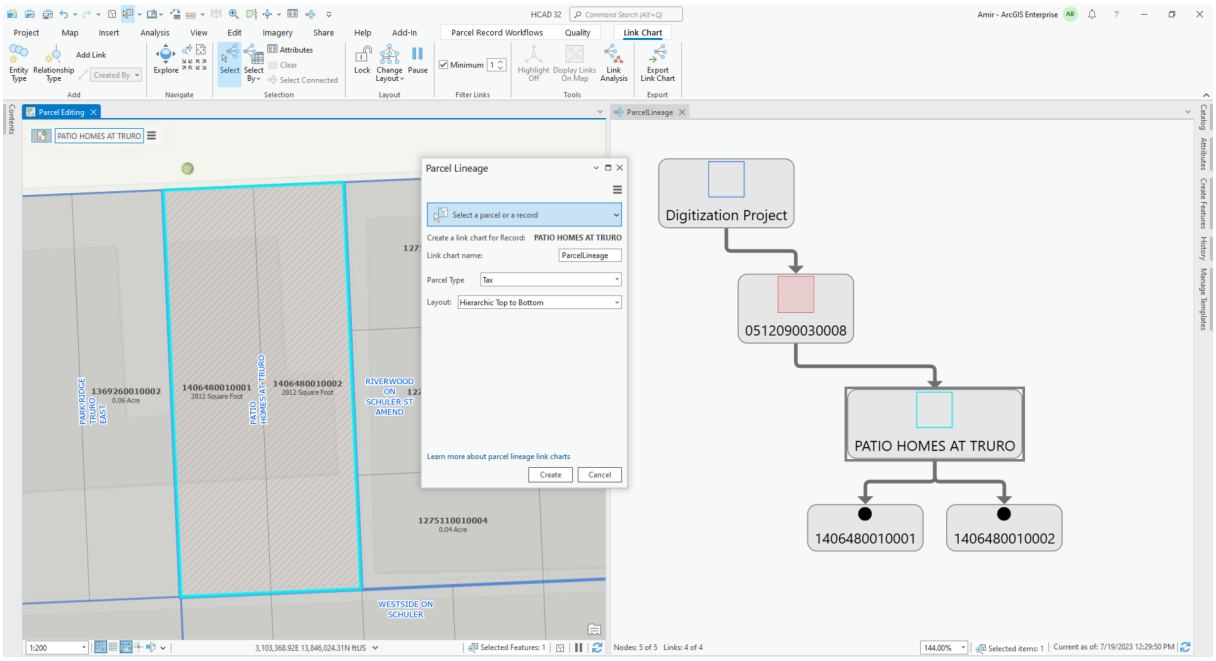

Figure 3. Parcel Lineage depiction (showing a split)

5.1.3 Editor Tracking and historic moments

Accountability and auditing are important principals in any 'system of record'. Only authorized users should be granted with editing capabilities and their edits must be tracked and traced. For that reason all parcel fabric feature classes have editor tracking enabled. Furthermore, the use of branch versioning for multi-user editing, preserves all historic states of all features, including those that get deleted. You can specify any historic moment and view the state of the data at that historic moment in time. A real 4D cadastre.

5.1.4 Geodesy

LADM does not specify the need for a spatial reference. Maybe that is a given, but every cadastral organization requires the ability to specify, project and transform cadastral data. Dynamin reference frames and moving data between epochs, is the latest requirement in that area.
In some countries the measurement are considered 'ground' measurement and therefore need to be reduced to the spatial reference plane. The parcel fabric stores the scale and rotation used when a 'ground to grid' correction is applied.
The Bureau of Land Management in the US, as well as other agencies that maintain the Public Land Survey System (PLSS), make use of geodetic direction types as well loxodromes. All of

which the parcel fabric supports and persists. This direction types are also used when using Least Squares Adjustment (LSA). While the parcel fabric can use any LSA engine, it is integrated with the robust DynAdjust LSA engine from GeoScience Australia and uses features and visualizations to show the results.

5.1.5 Online and Offline

The use of GIS files or directly connecting to a database is a thing of the past. Web services, on the other hand, allow for data to be made available for all types of clients: desktop, web and mobile. Instead of moving data from one place to the other (ETL), the administrator can decide which data should be made available to each group (public, organization, group). This means that all users use the most current data at any given time. The encoding of the data (e.g. JSON, protocol buffer compression etc.) is transparent to the user and can evolve over time to make use of the latest technological trends.
Additional capabilities are exposed through REST APIs, allowing thick and thin clients to make use of the server resources.
Users can also take the data offline, for example: to mitigate intermittent internet connection, and sync back their edits, when they have the required connectivity.

5.1.6 Automation

The Parcel Fabric exposes multiple options for Automation. Those are leveraged by organizations that seek for efficiency through automation. The REST APIs expose capabilities on the server. Those can be used to automate processes and integrate to a 3rd party system from any type of client. Python can be used as a wrapper to call the REST API methods, as well as many other methods when executed from ArcGIS Pro. Additionally, developers can use the .Net SDK to create Add-Ins that leverage the parcel fabric capabilities.
Another common pattern for automation is a "no code/low code" pattern. For example, users can use 'Experience Builder" to create an app that runs on their web browser, tablet or mobile device. Another pattern is to use Tasks. Tasks are fully configurable and are designed for repeatable workflows. They promote best practice and improve efficiency.

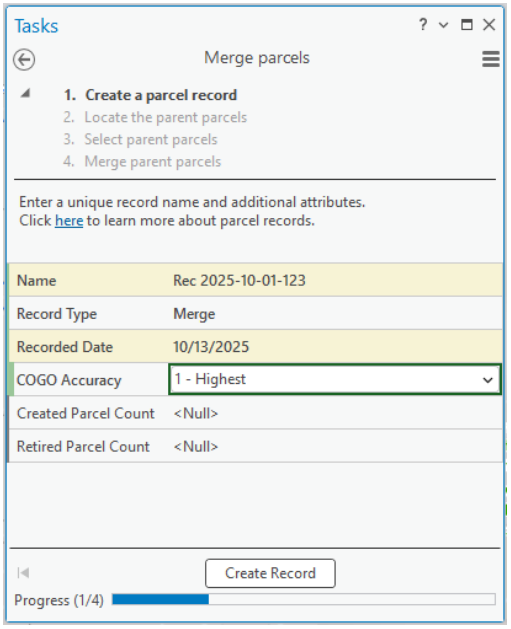

Figure 4. Built-in configurable tasks for repeatable workflows

6. IMPLEMENTING THE PARCEL FABRIC

The current generation of the parcel fabric, which is often referred as the 'Pro version', was designed for easy adoption. This is achieved by:

- **Extendable and flexible** - the parcel fabric information model is already LADM conformant. It can be easily extended by adding different parcel types and extending the schema of each one with its own fields and domains (code lists).
- **Migrate now – fix later**: you can migrate data in any condition and decide what and when to fix later. The data does not have to be topologically clean, accurate, or complete.
- **Simple**: the parcel fabric uses simple feature classes, simple layers and standard editing tools and versioning. This means that users can use well established patterns.
- **Great defaults** – when adding a parcel fabric to a map default layer are applied. The default layers have great settings for symbology, labeling, display expressions. Users can still modify those if they choose to. The parcel fabric also comes with default quality rules (topology and attribute rules) as well as additional rules that can be imported and configured.
- **Tasks** – the parcel fabric ships with common tasks for parcel fabric administration and record-driven workflows. They guide new users to use the correct tools in the correct sequence and reduce the learning curve.
- **Resources** - the parcel fabric is well documented in the help system. But there are many additional resources used by the community: the parcel fabric community where users ask and answer questions or watch the videos to learn new skills. The Parcel Fabric Meetup, where users from all over the world participate in free webinars, and many other forums by users and business partners who simply want to help other users.

6.1 Configuration first approach

Configuration adapts a system to user preferences by adjusting existing settings, features, and workflows, while Customization involves altering the underlying code to add new functionality or significantly modify its default behavior. Configuration is simpler, more cost-effective, and less risky, as it uses the software's built-in tools without changing its base code. Customization, on the other hand, requires coding expertise, is more expensive, and carries higher risks, such as increased complexity and potential issues during software upgrades.
To allow different organizations to meet their business needs the parcel fabric is highly configurable. Organization can configure the information model, maps and layers, quality rules, tasks, deployment type, interface language, groups and permissions and much more. The high level of configurability is a desired feature by cadastral organizations who seek to use a COTS (Commercial Off The Shelf) software to meet their immediate business needs and reduce the risk as opposed to the cost of designing and developing a custom system.

6.2 POC

A POC stands for 'Proof Of Concept'. A POC is a demonstration or a small-scale pilot project to show that a specific idea, technology, or process is feasible and viable before a large-scale investment and implementation. A POC is often used as a first step to identify and mitigate risks and identify any functional gaps.
The activity of designing and migrating data is included with every POC. Before starting a POC it is important to define 'what success looks like'. This will vary from one organization to the other. Some will only want to see that their current business processes be met, while others also examine future business processes they have never supported. A POC is a learning experience.

6.3 Vision

A clear vision is crucial for designing a new IT system because it provides a strategic roadmap, aligns stakeholders, prevents wasted resources, and serves as a compass for decision-making throughout the development process. It establishes a shared goal and purpose, ensuring everyone is focused on the future state and the problems the system will solve, which is essential for motivation and successful outcomes.
While many projects solve the immediate problems by modernizing old technology with a new one, it is important to have a vision for future aspirations, like 3D Cadastre, web editing, AI agents, Digital submissions, collaborations with other stakeholders, field to fabric workflows and such.

6.4 Implementations

The current (second) generation of the Parcel Fabric conforms with LADM abstract test suite (level 1-3). Since the parcel fabric is LADM compliant, it is the biggest driver of LADM implementation and adoption.
As of 2025 there are globally more than 500 implementations of the parcel fabric. Here are a few implementations that have been made public:

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Most organizations do not have the skills, resources, and time to implement a custom built land administration system. Instead, they seek a COTS (commercial off-the-shelf) software that can meet their business requirements. The high configurability of the parcel fabric and the ArcGIS system allows just that. Cadastral agencies can configure it to fit their purpose. The parcel fabric is designed to work with any type of land description system (metes-and-bounds, coordinate-based, …). Shipping the software with pre-defined workflows using the Tasks framework, reduces the learning curve for new users, promotes best practices and improves efficiency.

6.5 Roadmap

The parcel fabric road map is driven by customers requirements and technological trends.

6.5.1 SaaS

In 2026 organizations will be able to deploy their parcel fabric on ArcGIS Online as a SaaS (Software as a Service) solution. This will offer the advantages of reducing the upfront investment and ability to access it from anywhere with an internet connection. A SaaS deployment does not require any DBA and other IT professional while still providing backups, security and scalability.

6.5.2 Web Applications

Another trend is to use web applications. Web applications are usually focused on specific workflows, reduce the learning curve and usually require less hardware. Web applications can also execute on a variety of operating systems. Web editing capabilities will keep growing.

6.5.3 Field to Fabric

Cadastral data is usually collected in the field, then processed in the office to meet the cadastral requirements before being ingested in the cadastral system. This process is not efficient and important metadata is often lost. By supporting Field to Fabric workflows the quality control can be pushed to the field, and the entire workflow can be made more efficient.

6.5.4 3D Cadastre

The requirement for 3D cadastre varies significantly between countries. In many jurisdictions, 3D cadastre remains aspirational pending legislative changes. Nevertheless, the need to store and manage irregular 3D geometries above and below ground is growing. The Parcel Fabric will leverage the 3D object geometry type to meet many business requirements for 3D cadastre, aligning with LADM's capability to model volumetric spatial units (Van Oosterom et al., 2015). The parcel fabric will make use of the 3D object geometry type which meets many business requirements for 3D cadastre.

6.5.5 AI and Machine Learning

And last but not least, AI and machine learning capabilities are already being used today. The use of AI / ML will be expanded with the use of agents that will make many workflows more efficient.

7. INFORMATION MODEL MAINTENANCE AND DOCUMENTATION

Cadastral datasets require comprehensive metadata to ensure long-term usability and interoperability. While LADM addresses metadata through spatial and administrative sources, the Parcel Fabric extends this by storing **feature-level metadata** such as XY accuracy of points.
Schema reporting tools allow export of the information model to formats such as JSON, Excel, XML, and HTML, with hyperlink navigation between entities and code lists. Upcoming enhancements will include **schema change reports** to track modifications over time, supporting governance and compliance.
Information models keep evolving and keeping track of the changes is important. The next release of schema reporting will also be able to compare between 2 schema reports to create a change report.

Name	Dataset Type	Feature Dataset	Dataset ID
LADM	FeatureDataset		
RRR	RelationshipClass	LADM	57
ParcelFabric_AdjustmentVectors	FeatureClass	LADM	15
ParcelFabric	ParcelFabric	LADM	4
ParcelFabric_Source	FeatureClass	LADM	10
AdministrativeUnit_Lines	FeatureClass	LADM	36
ParcelFabric_Connections	FeatureClass	LADM	12
ParcelFabric_AdjustmentPoints	FeatureClass	LADM	13
ParcelFabric_Topology	Topology	LADM	26
ParcelFabric_AdjustmentLines	FeatureClass	LADM	14
SpatialUnit	FeatureClass	LADM	31
ParcelFabric_Points	FeatureClass	LADM	11
SourceHasSpatialUnitLines	RelationshipClass	LADM	34
SourceHasAdministrativeUnitLines	RelationshipClass	LADM	38
AdministrativeUnit	FeatureClass	LADM	35
SourceHasAdministrativeUnit	RelationshipClass	LADM	37
SourceHasSpatialUnit	RelationshipClass	LADM	33
SourceHasConnections	RelationshipClass	LADM	25
Party	FeatureClass	LADM	56
SpatialUnit_Lines	FeatureClass	LADM	32

Figure 5. A schema report of a parcel fabric using LADM ontology (pdf)

8. CONCLUSIONS

Any LADM implementation should be recognized as an IT system, requiring adherence to best practices for sustainability, security, and scalability. The **6 pillars of a 'well architected system'** are directly applicable to LADM implementation.

The Parcel Fabric's success as a physical information model is rooted in its LADM compliance and its ability to extend beyond the standard to meet specific business requirements. Its flexibility, scalability, and configuration options make it easier for cadastral organizations to implement LADM in production environments.

Web services and modern encodings offer seamless integration between different systems, scalability, and cost-effectiveness due to reliance on standard, inexpensive protocols like JSON and HTTP. They also improve interoperability, allowing disparate applications to communicate and share data, and offer enhanced security for data.

The near-term release of the parcel fabric as SaaS will allow organizations to take advantage of cloud computing.

With upcoming SaaS deployment, enhanced web applications, and support for advanced workflows such as Field-to-Fabric and 3D cadastre, the Parcel Fabric is positioned to remain a leading driver of LADM adoption worldwide. As LADM evolves, the Parcel Fabric will continue to adapt, ensuring sustainable and future-ready cadastral systems.

REFERENCES

Van Oosterom, P., Lemmen, C., Uitermark, H., Zevenbergen, J., & van der Molen, P. (2015). Land Administration for Sustainable Development. FIG Publication No. 68. International Federation of Surveyors (FIG).

Van Oosterom, P. (2018). Developments in the Land Administration Domain Model (LADM). Land Use Policy, 49, 527–540.

Kara, A., Çağdaş, V., & van Oosterom, P. (2021). Implementation of LADM in Cadastral Systems: Country Profiles and Practical Experiences. Journal of Geospatial Engineering, 3(2), 45–62.

FIG (2025). LADM in the Classroom. FIG Publication. Available at: https://www.fig.net/resources/publications/figpub/LADM_extended/LADM_ITC_Book_ext-2025.pdf

Esri (2024). ArcGIS Architecture Framework: Well-Architected Pillars. Available at: https://architecture.arcgis.com/en/framework/architecture-pillars/introduction.html

BIOGRAPHICAL NOTES

Amir Bar-Maor graduated with a degree in geodesy from the Technion – Israel Institute of technology in 1999 and a masters degree in geodesy in 2002. After working for several years designing and implementing GIS technology, he joined esri in 2008 – initially as a project manager and consultant for cadastral projects and later as a product engineer in software development. Amir is a licensed cadastral surveyor and a licensed real estate appraiser.

Brent Jones oversaw Esri's worldwide strategic planning, business development, and marketing activities for land records, cadastral, surveying, and land administration. As a recognized innovator, Jones specializes in modernizing existing land administration systems and designing new GIS-based cadastral management systems for small and large governments globally. He is a licensed professional land surveyor and engineer, past member of the URISA board of directors, recipient of the 2019 URISA leadership award, past president of GITA (Geospatial Information and Technology Association) and a current member of the UNGGIM -LAS United Nations Committee of Experts on Geospatial Information Management sitting on the Expert Group on Land Administration and Management.

CONTACTS

Amir Bar-Maor
Esri
380 New York St.,
Redlands

USA
Phone: + 31 6 49047679
E-mail: abarmaor@esri.com
Website: www.esri.com