Managing Parcels with ArcGIS Pro

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Agenda:

- Powerpoint of ArcGIS Pro Parcel Fabric
- Demo
Parcel Management Capabilities (UC 2019)

• Parcel editing in ArcGIS Pro: record driven and quality driven workflows.
• Parcel quality evaluation
• Historic parcels
• Dual depiction of the legal and physical world
• Associate cadastral features to their legal source
• Record features are the footprint of the legal transactions
• Land descriptions: metes and bounds, area description, natural features, coordinate based

Why ArcGIS for Parcel Management?
Parcel Management with ArcGIS Pro
Designed for the next 15-20 years

- ArcInfo
  - 2000’s
  - COGO Coverage

- ArcMap
  - 2010’s
  - Geodatabase Topology
  - COGO editing

- ArcMap
  - 2019
  - Parcel Fabric for ArcMap
  - Parcel Editor

- ArcGIS Enterprise
  - ArcGIS Pro
  - Parcel Fabric
Parcel Management Capabilities

- Parcel editing in ArcGIS Pro: record driven and quality driven workflows.
- Parcel quality evaluation
- Historic parcels
- Dual depiction of the legal and physical world
- Associate cadastral features to their legal source
- Record features are the footprint of the legal transactions
- Land descriptions: metes and bounds, area description, natural features, coordinate based
- Robust & scalable
Types of Parcel Workflows

- **“Record Driven” workflows:**
  - Triggered by a legal transaction
  - Limited in time & location
  - Usually creates and retired parcels → parcel lineage

- **“Quality Driven” workflows:**
  - Can be applied at any time
  - Any scale
  - Systematic / ‘ad hoc’
Deployments
Pro License Level: Standard / Advanced

Single User

Enterprise
Ask yourself…

• How many new parcels were created in this fiscal year?
• How much time do map technicians spend on text placement?
• Is your data spatially accurate?
• What percentage of your parcels have a bad misclosure ratio (bigger than 1:5000)?
• Can you easily detect parcel data errors?
• Do you have other datasets (e.g. zoning / administrative boundaries) that do not align with the parcels?
• Do you have overlaps / gaps between parcels?
• Can you visualize your parcels in 3D?
• Do you preserve the record measurements? Historic parcels?
• Does the public have easy access to current authoritative data?
Parcel Fabric is Based on a Service Oriented Architecture
Parcel Fabric Works Across the Entire ArcGIS Platform

Device
- Boundary data collection
- Boundary resurvey
- Geodetic control

Desktop
- Editing, Maintenance
- QA/QC
- Adjustments
- Map Authoring

Web
- Geo-enable business systems
- Digital submission
- Web editing - Parcel Drafter
- Executive Dashboards

Server

Portal

4D Parcel Fabric Transaction Model Attribute Rules

Online Content and Services
What is a ‘Parcel Fabric’?

• A System of Record
• A specialized dataset designed for parcel management
  - Record Driven
  - Geometry Driven
• A ‘Parcel’ is comprised of
  - One polygon
  - A sequence of lines
  - Corner points
COTS (Commercial off-the-shelf)

- Parcel Fabric comes with ArcGIS Pro
- Ribbon is enabled when a Parcel Fabric is created
- Used to edit parcel fabrics
- Edit, Analyze and Share data using web services

Works "out of the box"
When to Use the Parcel Fabric

- Data quality is important
- Spatial accuracy is important
  - Parcels in the same layer have different levels of accuracy
  - Accuracy needs to get better with new accurate survey data
- Spatial alignment between multiple parcel types (multipurpose cadaster)
- Each parcel needs to preserve its original geometry and history
- Structured, automated workflows
- 3D Visualization of parcels

Adjustments are based on accuracy of survey data
Parcel Fabric Information Model

- Parcel fabric **controls** feature classes and errors
- Exposed through the **Parcel Fabric Layer**
- Each parcel type has its own polygons and lines
- Plans table → Records Feature class (footprint geometry)
- Points, Control points, line points → Points
- Connection line have their own feature class
- Errors are features (polygon, lines and points) you can visualize
Editing with the Parcel Fabric in ArcGIS Pro

- Easy & simple
- Learn to edit once - same editing UI/UX
- Some tools use the Parcel Server SOE REST API:
  - Merge
  - Clip
  - Build
  - ...
- Tasks can be configured to make it even easier
Why Use the Parcel Fabric

• Efficiency gains:
  - Faster processing
  - Reduce redundant work
  - Maps can be generated automatically

• Data access and transparency:
  - Transparency – provide timely access to authoritative current data using web services
  - Better decision making across departments
  - Better customer service using public facing maps and apps

• Data Quality:
  - Better data integrity
  - Improve spatial accuracy
  - Maintain history

*Efficiency, Quality, Fairness, Better Customer Service, COTS*
Topological Integrity

- Topological integrity is maintained when parcel features are moved, rotated or scaled for:
  - Points
  - Boundary lines
  - Parcel polygons
- Legal recorded dimensions do not change
- Topological rules can be configured and evaluated
Historic Parcels

- Historic parcels are automatically created and can be visualized
- Historic and current parcels are aligned
- Appropriate boundaries are retired
Parcel Lineage

- Parcels are associated to the:
  - Record that created them
  - Record that retired them
- Current parcels are parcels where: ‘RetiredByRecord IS NULL’
- Parcel lineage exists within a parcel type
- Future release will also depict the lineage
System of Record

- Parcel polygon, boundary lines, connection lines and points are all associated to their legal record
- Record geometry (footprint) updated automatically
- Record features can be easily isolated and viewed
Built-in Workflows

- Tasks are configured for repeatable workflows
- Common parcel workflows are provided to guide new users in ArcGIS Pro
- Configure provided workflow and/or add your own
- Improves efficiency and reduces error
Vertical Alignment

- Alignment is maintained between different parcel types
- Layers can be turned on and off
- Points are the “glue” between parcels
- Legal dimensions do not change
Use Any Editing Tool in ArcGIS Pro

- Flexibility to use any editing tool
- Many tools are ‘parcel aware’
- Learn how to edit once
- Examples:
  - Editing constraints
  - Intersection tool
  - Curve Fillet
  - Update COGO
  - Trace
  - …
Built in Quality Management

- Authoritative data in a system of record requires quality management
- Quality can be evaluated at any point of time
- Rules can be configured
- Rule types:
  - Parcel fabric integrity using parcel rules
  - Geometry using topology
  - Attribute integrity using Attribute Rules (optional)
Service Oriented Architecture

• Data is current → can be trusted
• All clients (web, mobile, desktop) view current data
• Rich REST API (supported @ 10.8)
Modeling and Behavior

- Quality is the backbone of every ‘System of Record’
- Model **parcel behavior** using:
  - Parcel rule engine
  - Topology rule engine
  - Attribute rule engine
- Errors can be visualized on any client
- Fix methods for common parcel errors
- Push QA to the field / submitting party
3D Enabled

- Extrude and visualize parcels in 3D
- Line of sight and viewshed analytics
- Dynamic dashboards
3 Phased Release Plan

2019
- **Parcel Editing (ArcGIS Pro 2.4.x – Enterprise Server 10.7.1)**
  - Capabilities: record driven and quality driven editing workflows
  - Target: customers that perform parcel editing but do not perform LSA (parcel index mapping)
  - Examples: US county assessor shops, Cyprus DLS.

2020
- **Spatial Accuracy (ArcGIS Pro 2.5 – Enterprise Server 10.8 - @Spring – UC)**
  - Capabilities: improve spatial accuracy using measurements and control points.
  - Target: customers that perform LSA, associated feature adjustment, bring your own LSA.
  - Examples: BLM, Teranet Canada, LandGate Australia.

2021
- **Modern Cadastre (2021)**
  - Capabilities: advanced and modern capabilities: 3D Cadastre, Digital Submission, Coordinate based cadastre, Parcel lineage
  - Target: progressive customers with sophisticated / modern cadastral systems
  - Examples: LINZ, LTSA Canada, Cadasta (Fit For Purpose).
What’s New:

- Administrative Boundaries
- **SDK**
  - Rest API
  - ArcGIS Python API
  - .Net SDK (internal name space)
- GeoProcessing Tool Upgrade Dataset
- Parcel Fabric Properties
- Parcel Fabric ‘Manage’ Context Menu
- Divide Tool
- Import & Export ArcMap Traverse Files
- Parcel Fabric licensing to Non-Pro Clients
What’s New: (cont.)

• Alignment
  - Align parcels
  - Align features

• Spiral Curves

• Publication Layers
  - Layers you can have update off of the Parcel Fabric

• Parcel Workflow Tasks
  - Insert tab
  - Not layer agnostic
  - New workflow for parcel subdivision

• Schema:
  - COGO Type
  - Parcel count field
What’s New: (cont.)

- Subtype Layer Symbology
- Software quality
- Documentation

- Updates for 2.5
- Video Link: https://community.esri.com/videos/5740-whats-new-arcgis-pro-25-for-parcels
- Online FREE Training Course for a split
Parcel Fabric on the entire ArcGIS Platform

3 Phased Release

Legend:
Phase 1 – UC 2019
Phase 2 – UC 2020
Phase 3 - 2021

Mobile
- Visualization
- Boundary data collection
- Boundary resurvey
- Geodetic control

ArcGIS Pro
- Map Authoring
- Editing, Maintenance
- QA/QC
- Adjustments
- 3D Cadastre
- Parcel Lineage

Web
- Visualization
- Executive Dashboards
- Geo-enable business systems
- Web editing
- Digital submission

Parcel Fabric
- 3D enabled
- Time aware

Portal

Server

Parcel Fabric

Legend:
Phase 1 – UC 2019
Phase 2 – UC 2020
Phase 3 - 2021
Summary

- The Parcel Fabric is designed for the next 15-20 years.
- Supports ‘Record driven workflows’ and ‘Quality driven workflows’.
- Meets modern cadastral requirements: 3D, coordinate based, lineage, digital submission…
- Works “anywhere”: any client, any cadastral system / land description.
- Easy to adopt and fast to deploy.
- Efficient, scalable, configurable.
- Geo-enables business systems.