

New Mexico State Land Office

ArcGIS for Windows Mobile and Trimble Yuma

Thirteen Million Acres, Twelve Districts: Extending the Enterprise to the Field

Presented By:

Eleanore Nestlerode
and Natalie Runyan

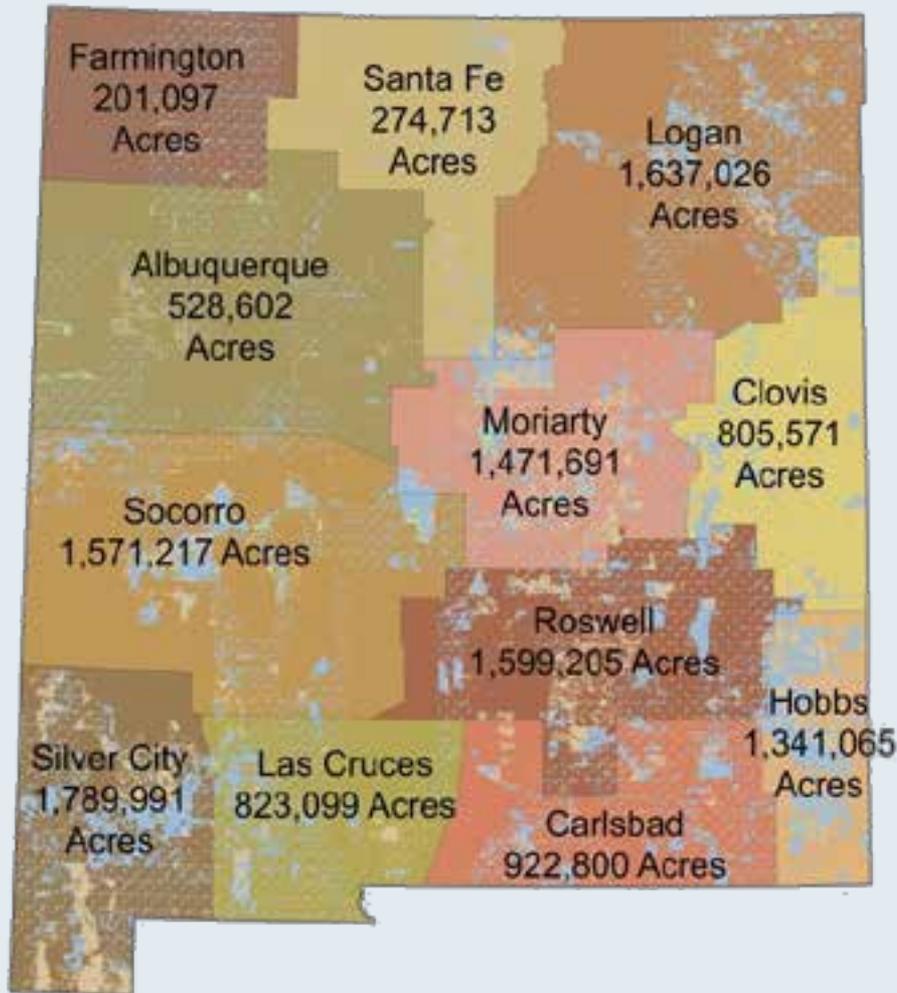
Esri UC, San Diego

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New Mexico State Land Office

District Acreage



One
District Resource Manager
Per District

(Hobbs has two)

Four Field Specialists

- Forester
- Biologist
- Archaeologist
- Environmental Scientist

Field Operations

- **Generate income today**
 - ∅ leasing, easements, permits
- **Protect long-term health of land & habitat**
 - ∅ plants, animals, waters, forests, rangelands, noxious weeds
- **Safety/Vigilance**
 - ∅ Range/Wildland Fires
 - ∅ Environmental Emergencies



Field Operations

- **Highest and best use-
Protect Trust Assets**
 - ∅ improvements, land valuation
- **Prevent waste and trespass**
 - ∅ dumps, criminal activity, spills, hazards mitigation
- **Land Management**
 - ∅ lessee relations, access issues, inter-agency coordination



What we had...

- **Diverse GPS data capture**
 - ∅ Various Garmin and Trimble instruments
 - ∅ Various levels of expertise
- **Diverse methods of map integration**
 - ∅ *Website mapping tool*
 - ∅ *MapTech, All Topo*
 - ∅ *Hand sketching*
- **No real interoperability**

What we needed

- **Standardize Field Data Collection Protocols**
 - ∅ **New devices**
 - ∅ **Rich data sources**
 - Enterprise
 - Field
 - External
 - ∅ **Disconnected editing**
- **Quick Implementation**



Yuma Advantages

- **Anything done with existing multiple devices (*GPS, cameras, laptops*)**
 - ∅ **In or from vehicle**
 - ∅ **In the field**
- **A consistent field interface**



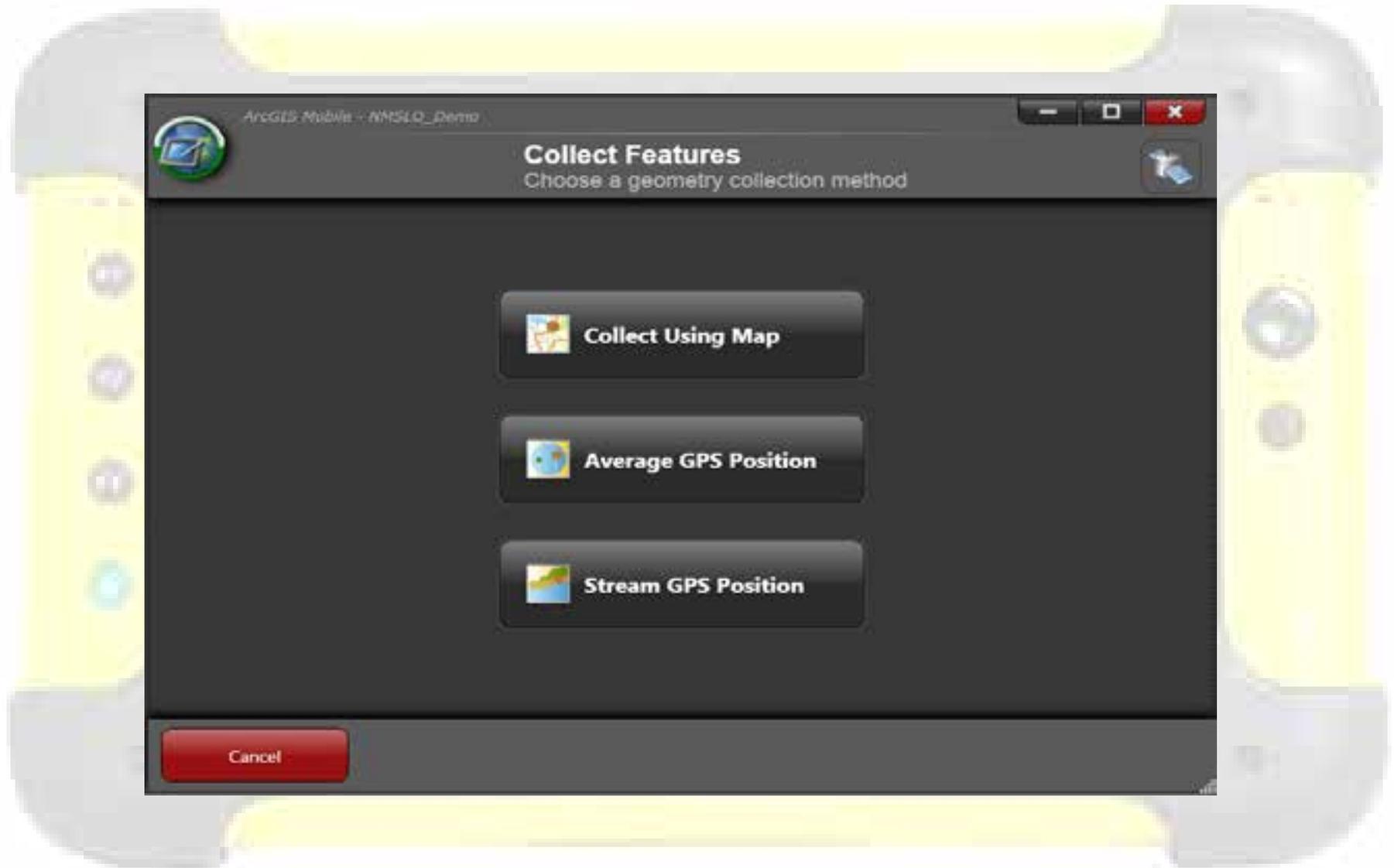
More Advantages

- **A solid base map**
 - ∅ **Current, Accurate**
 - ∅ **Complete**
 - ∅ **Standardized**
- **Navigation**
- **Feature data collection**
 - ∅ **All features: points, lines, polygons**
 - ∅ **Refined for photos, improvements**
 - ∅ **Sync to Santa Fe**

Opportunities

- **Trimble/Yuma, INTERA choices**
 - Ø **Need for quick and reliable implementation**
 - Ø **Mutual familiarity**
 - Ø **State vendors**

Why ArcGIS for Mobile



A few points about ArcMobile



Conceptual Data Model

∅ **Basemap**

- ∅ tiled map cache from statewide unmanaged mosaic, district exports, cloud process
- ∅ NAIP 2011, DRG

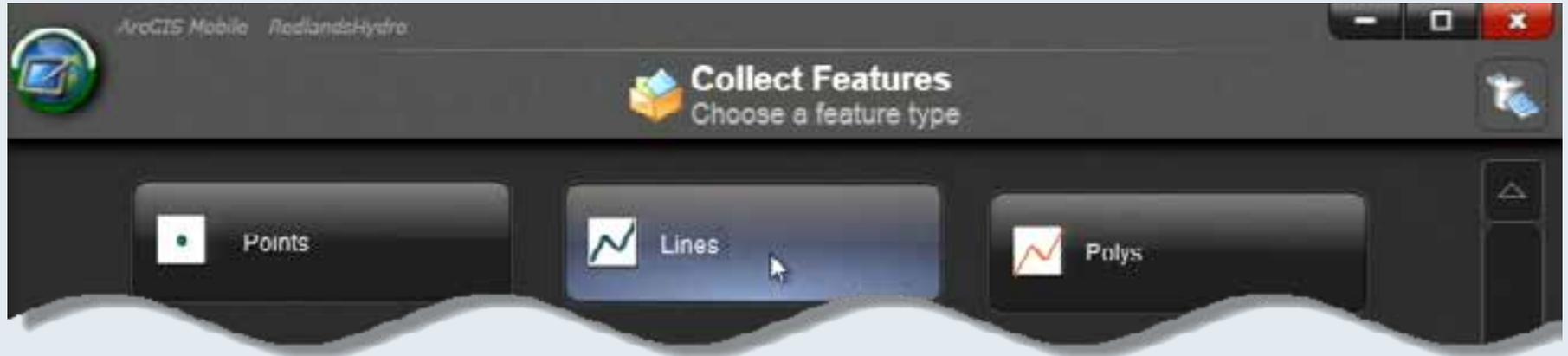
∅ **View-Only Operational**

- ∅ mobile cache from MXD, scripted (toolbox) export to network (SF & device)
- ∅ Scale-dependent labels, rendering, symbology, filtering

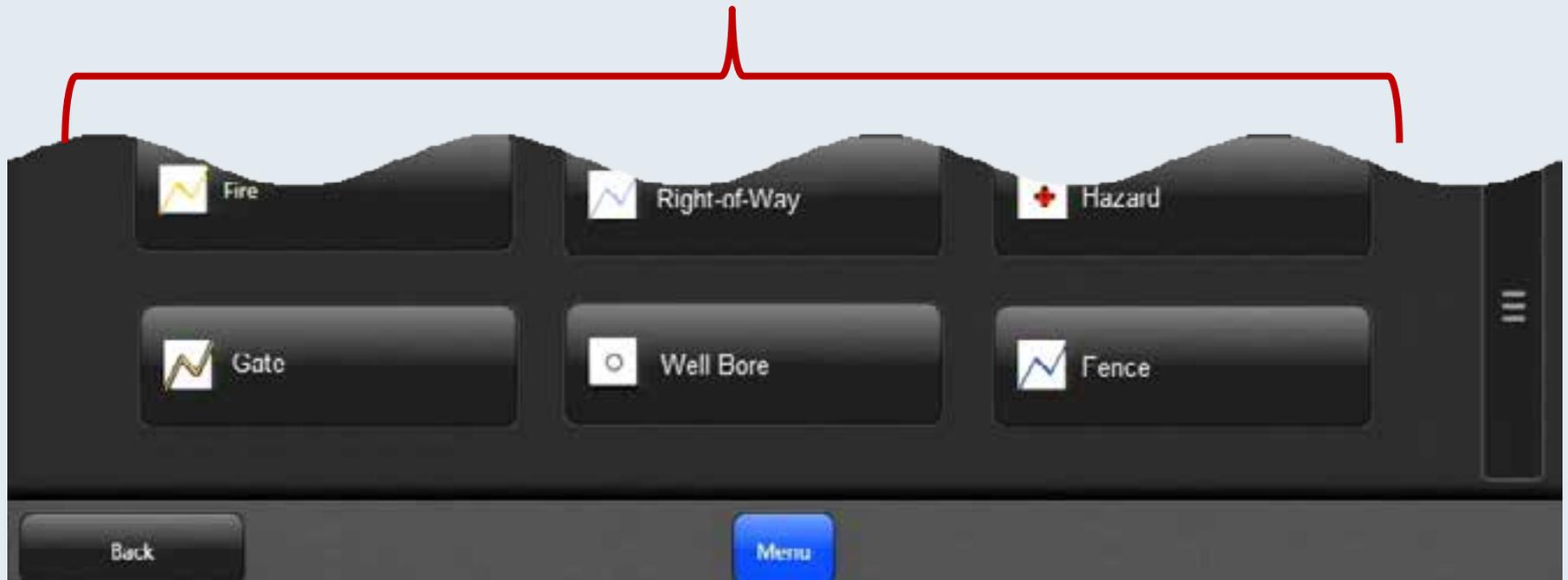
∅ **Field-Collected Operational**

- ∅ mobile cache from map service, updates via Mobile sync

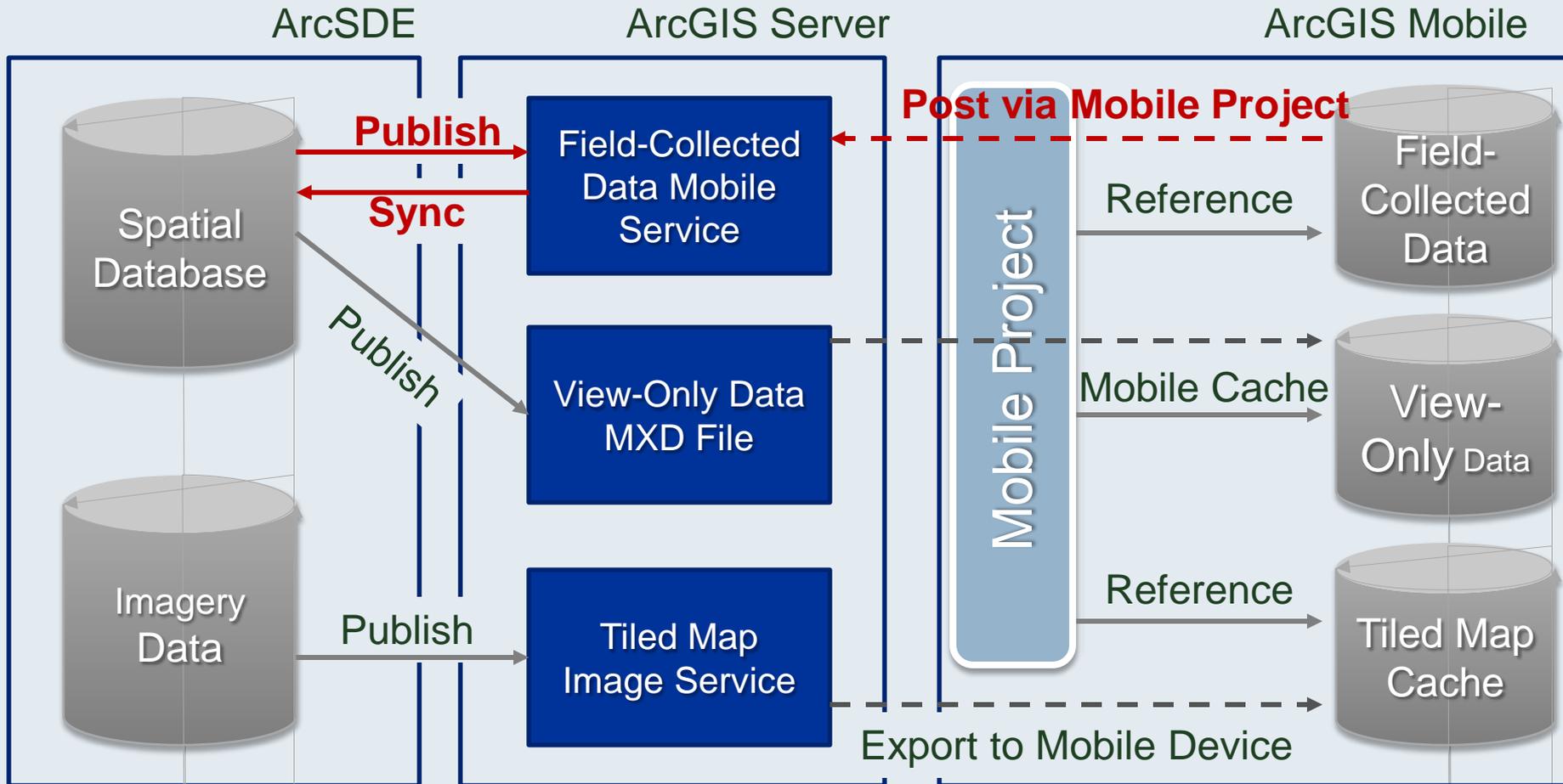
Conceptual Data Model Field-Collected Operational



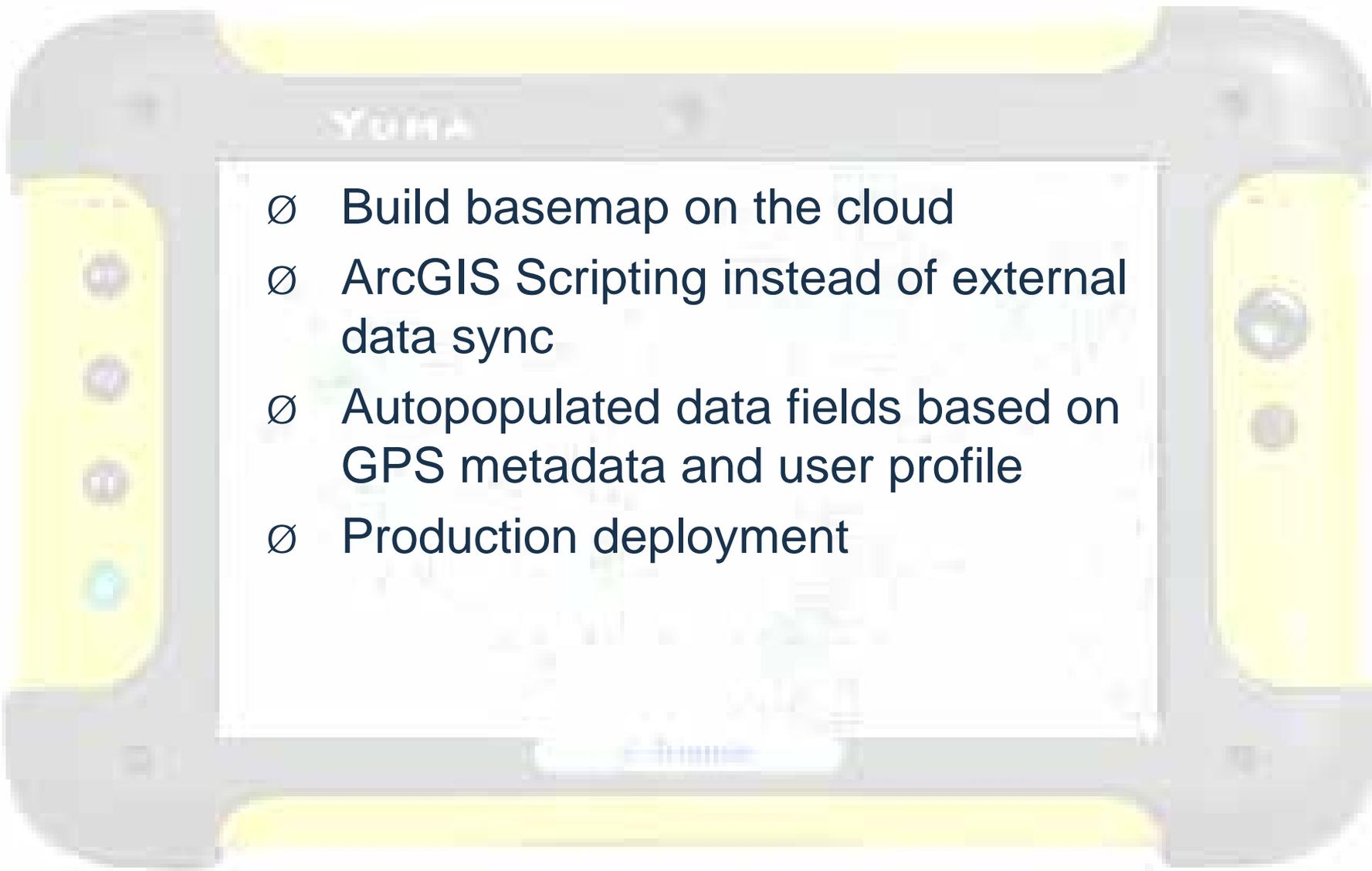
...to become



Implementation Software Architecture



Implementation

- 
- A ruggedized handheld device, possibly a PDA or rugged smartphone, with a grey and yellow frame. The screen displays a list of implementation points. The device has several buttons on the sides and a small display at the bottom.
- ∅ Build basemap on the cloud
 - ∅ ArcGIS Scripting instead of external data sync
 - ∅ Autopopulated data fields based on GPS metadata and user profile
 - ∅ Production deployment

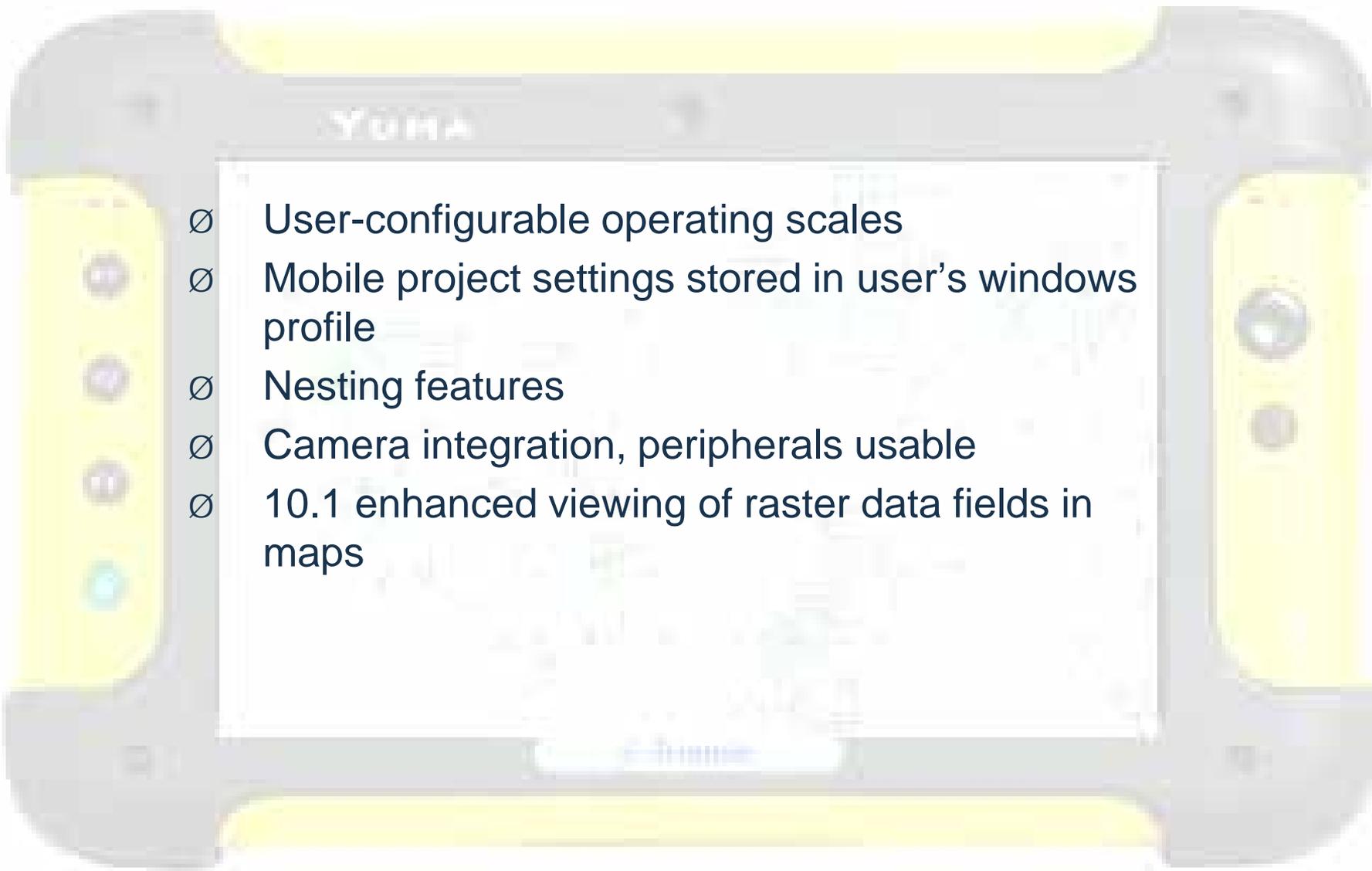
Good to Know

- ∅ Configure in database, MXD; edit the mobile project config in XML
- ∅ Cloud processing is fast, but plan time for data transfer
- ∅ If no experience with tiled map cache, create 'complete' sample for representative area; 20-80GB/DRM
- ∅ "Get Data" must have GPS signal to control extent
- ∅ Image mosaics with different smallest scales, largest tile had missing areas; get direct from USDA image server
- ∅ File geodatabase fine, allows user edits in desktop
- ∅ If need high resolution photos, don't use Yuma camera

Don't Forget

- ∅ Store photo direction as degrees so you can rotate symbol in map
- ∅ Domains/Subtypes for user satisfaction, time savings
- ∅ 2 network connections for office workers
- ∅ Can't group layers, consider different projects for distinct business processes
- ∅ Re. ROI, consider extensibility to non-traditional users
- ∅ can be primary computing device

Mobile Features

- 
- ∅ User-configurable operating scales
 - ∅ Mobile project settings stored in user's windows profile
 - ∅ Nesting features
 - ∅ Camera integration, peripherals usable
 - ∅ 10.1 enhanced viewing of raster data fields in maps

Highlights from the Wish List

- ∅ Single feature capture with GPS & heads-up
- ∅ Autopopulate feature attributes per spatial coincidence
- ∅ Formatted export of device contents for field reports
- ∅ Panoramic photos
- ∅ Publish reference content for Executives
- ∅ Publish uncommon/heavy data for 'Get Data' option
- ∅ Other ArcMobile specific enhancements such as:
 - ∅ Previous scale, configurable feature ID's in list results, measure during data collection, custom attributes on mouse rollover, custom units of measure (ex. Rods)

Lessons Learned

- **Data Storage Space**
- **Detached camera still preferable to unit**
- **Layer transparency**
- **Satellite acquisition sometimes an issue**
- **Unique-to-district layer availability**

...More Lessons Learned

- **SDX Card availability**
 - Ø Projects extending beyond 10-mile buffer
 - Ø Assisting another district
 - Ø Disconnecting SDX card electronically FIRST
- **Screen is less visible in bright sunlight**
- **Accessories issues (docks, keyboards)**

Results

- **Improved output**
 - ∅ **Consistent and more accurate product**
 - ∅ **Greater efficiency**
 - ∅ **General Field Ops enthusiasm and involvement**
 - ∅ **Report maps significantly improved**
- **Reliable, digital data**
 - ∅ **Data more universal**
 - ∅ **Data now available on enterprise**
- **Navigational aspect very useful**
 - ∅ **Orthophotography an essential**
 - ∅ **GPS accuracy improved over previous methods**

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Please contact us...

Eleanore Nestlerode, enestlerode@slo.state.nm.us

Natalie Runyan, nrunyan@intera.com

