



# Implementing ArcGIS Mobile In the Enterprise

*Myles Sutherland*  
*Michael Miller*

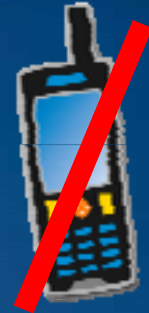


# Introductions

- **Who do you have presenting today?**
  - **Myles Sutherland**
    - **Product Manager for ArcGIS Mobile**
    - **Work with products, sales, marketing, and business dev**
    - **Background in mobile mapping, GPS, LBS, & GIS**
  - **Michael Miller**
    - **Technical Marketing for ArcGIS**
    - **Works with sales and customers directly**
    - **Expertise in developing mobile applications**

# Schedule

**Please!**  
Turn **OFF** cell phones  
and paging devices



- **Today we will cover ArcGIS Mobile**
  - Overview of technology
  - Discuss its place in the enterprise
  - Best practices and patterns
  - Demonstrations...
- **Feel free to ask questions as we go**
  - Keep them short and quick
  - Michael has to catch a plane so...
  - We will have a longer Q&A at the end

**Please complete the session survey!**

**ArcGIS Mobile**  
**Quick fire introduction...**

# What is ArcGIS Mobile?

*Mobile mapping and GIS technology*

- **Take maps and data to the field**
  - Collect, inspect, and edit maps
  - Use GPS for accurate location
- **Use Internet for real-time data access**
  - Post field data over wireless networks
  - Download maps on-demand using location
- **Deploy to range Windows devices**
  - Smartphones and PocketPCs
  - TabletPCs and Laptops

*Extend your existing investment in GIS outside the office*

# Why use ArcGIS Mobile?

*Many benefits to mobile GIS*

- **Accurate geographic data collection**
  - Increase quality of map data
  - Make better decisions
- **Current field to office business information**
  - Improve freshness of map data
  - Make more rapid decisions
- **Field access where and when it is needed**
  - Reduce cost for managing field teams
  - Ensure productive workforce outside office

*Benefits for mobile GIS are numerous – great for the bottom line!*

# What is the use case for ArcGIS Mobile?

*Common pattern in all enterprise organizations*



*ArcGIS Mobile key building block in any successful GIS*

# Who is using ArcGIS Mobile?

*Used in range of mobile enterprise scenarios*



- St Clair Street Sign Inspections
- Oakland County Pet Survey
- Los Angeles County Road Assessments
- City of Dover NASCAR Event Management
- Broward County Sheriffs Office
- District of Columbia Water and Sewer
- Nassau County Infrastructure Mapping
- BaySF Forestry Management
- Loma Linda University Medical
- City of Buffalo Fire Safety
- Virginia Department of Forestry
- Charlotte-Mecklenburg Utilities
- PIDPA Netherlands
- CSX Railway
- Austin Energy Utilities
- Coachella Valley Inspections

*Many of you are already using ArcGIS Mobile...*



# What do you get with ArcGIS Mobile?

*Key component of ArcGIS Server...*

- **ArcGIS Mobile consists of**
  - Out of box Windows Mobile application
  - .NET Software Development Kit
  - ArcGIS Server Manager integration
  - ArcGIS Server mobile data web service
- **Included with ArcGIS Server**
  - Advanced Enterprise edition
  - 50 deployments included
  - Additional 25 packs available

*Leverages ArcGIS Server for centralized management*

**ArcGIS Mobile**  
**Mobile enterprise systems**

# Understanding mobile enterprise systems

*More than just an application...*

- **ArcGIS Mobile is one technology...**
  - Many other aspects to successful system
  - Designed to fit into existing IT and GIS workflows
- **When deploying you need to understand**
  - Information workflows
  - Technology platforms
  - Expected user loads and demands
  - Best practices and patterns
- **Most importantly end user experience!!!**

*Mobile enterprise is high value aspect of business – many facets to success!*

# Information workflows

*Success is often defined by field worker use...*

- **What are the entry and exit points?**
  - What do field teams need to capture?
  - What do IT teams need to hand off?
- **Analyze existing information workflows**
  - Adapt to provide a robust field experience
  - Support with server side processes
- **Field workers are not database savvy**
  - Create field schema for collection
  - Simplify and flatten data model

*Don't let paper rule the day...build for easy of use and responsiveness!*

# Technology platforms

*Many players and needs for mobile enterprise*

- **Need to understand existing technologies in use and/or what components are needed to ensure success**

Technologies	Examples
Business systems	Microsoft, Oracle, SAP, Maximo
Mobile devices	Motorola, Panasonic, Trimble
Deployment	Microsoft, Soti, BlueDot, Oracle
Application gateways	Sybase, Antenna Soft, SyClo, Ventyx
Network providers	AT&T, Verizon, Sprint, T-Mobile
Location solutions	Trimble, TomTom, Garmin

*Many integration points to consider...*

## User loads and demands

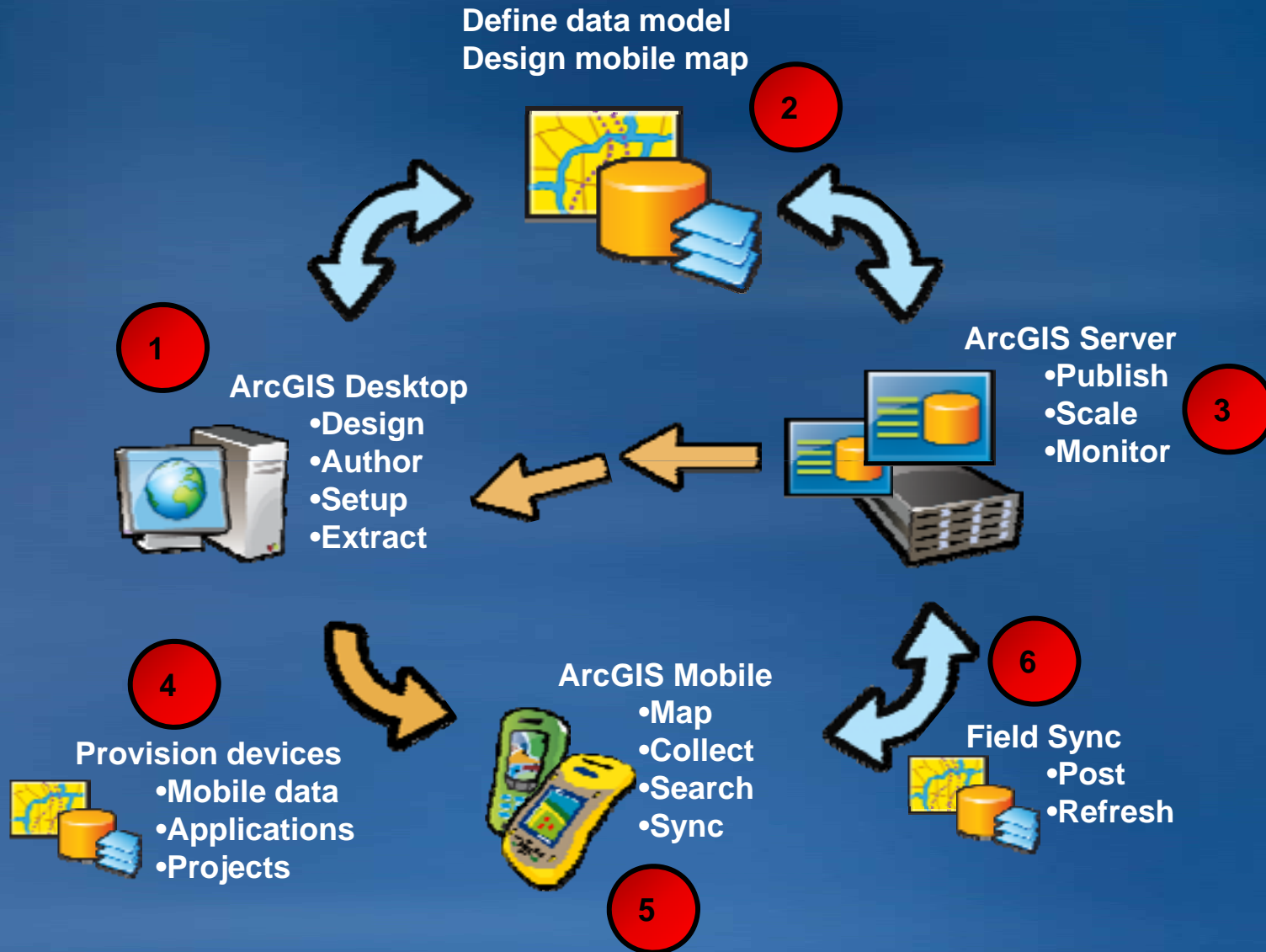
*Success is often defined by field worker use...*

- Easy to make simple IT decisions...
- Do not overlook need to for field worker advocacy
  - Service level agreement between IT and the Field teams
  - Capabilities and experiences of the field workers themselves
  - Many are not willing to accept less than adequate experiences

*Don't let paper rule the day...build for easy of use and responsiveness!*

# What is the workflow for ArcGIS Mobile?

Leverage ArcGIS throughout...



# ArcGIS Mobile

## Best practices and patterns



# Performance of ArcGIS technology

*Focus on workflows and evaluate with data*

- Provisioning processes and workflows
- Operational loads and architecture
- Disaster recovery and re-provisioning

*Many aspects to successful use of ArcGIS Mobile*

# Provisioning workflows

## *Data management for mobile*

- **Understand data access options**
  - **Access maps on-demand using location**
    - Ideal for small postage stamp datasets
    - Optimized map layers streamed over wireless
  - **Devices are pre-loaded with maps**
    - Ideal for large deployments over large geographies
    - Put in place a third party software to manage workflow

*Enterprises can easily manage data access...*

# Provisioning workflows

## *Data management for mobile*

- **Create re-usable data management strategy**
  - **Define an organizational mobile base map**
    - ETL specific layers from departments
  - **Generalize data for mobile base map**
    - Simplify geometries for streets, parcels, buildings
    - Use MXD to filter our attribute fields
  - **Define an update workflow**
    - How often to update? What is the method?
    - Depends on process cost and importance

*Enterprises can easily manage base maps...*

# Provisioning workflows

## *Map design for mobile*

- **Understand what field teams require to be effective in their work. Complex maps can often confuse...**
  - **Minimize number map layers**
    - Use high contrast and simple symbology
    - Configure appropriate scale dependencies
  - **Define types of map layers**
    - Operational for editing and synchronization
    - Base maps for visual context and/or query

*Enterprises can easily manage base maps...*

# Provisioning workflows

## *Data management for mobile*

- **Example base map workflows...**
  - **Create a compressed mobile base map**
    - Use GP tools to extract out data into SDC format
    - Good compression but does not support raster or query
    - Supported in both out-of-the-box and custom applications
  - **Create a second mobile service**
    - Use GP tools to extract from service
    - Add as a map data source in your custom app
    - Not supported with out of-the-box application

*Enterprises can easily manage base maps...*

# Operational workflows

## *Data management for mobile*

- **Understand main use cases for field work...**
  - **Feed data management system**
    - Data posted in batch through LAN
    - Leverage ArcGIS Desktop to manage QA/QC process
    - Ideal for ensuring accurate geographic information
  - **Feed common operational picture**
    - Data posted on-demand through cellular wireless
    - Leverage GIS viewers (Explorer, Flex, JavaScript, Silverlight)
    - Ideal for ensuring real-time view of completed work

*Enterprises can easily manage collection workflows...*

# Editing architecture

## *Data management for mobile*

- **ArcGIS Mobile is designed to extend ArcGIS with simple and easy to use for data collection workflows**
  - **Segment field data from enterprise data**
    - Create Mobile Geodatabase or Version
    - Define specific field schemas
  - **Think of field data as a thematic layer in your GIS**
    - Create map sketch, inspection, and GPS data collection tools
    - Field teams always collect new features in Geodatabase
    - Reduces need to segment and manage editing conflicts
    - Provides easy workflow for QA/QC using Desktop

*Enterprises can easily manage collection workflows...*

# Editing architecture

## *Data management for mobile*

- **For example, create Geodatabase schemas to represent specific field tasks**
  - **Create easy to use field tools**
    - Markup a map with new line feature sketches
    - Inspect existing features with new point features
    - Collect new map features using a feature dictionary
  - **Capture and enforce mobile specific attribution**
    - Use Data/Time fields
    - Assign Worker ID fields
    - Require specific field values
    - Use domains/subtypes

*Enterprises can easily manage collection workflows...*



# Editing architecture

## *Data management for mobile*

- **Use ArcGIS Desktop to manage QA/QC**
  - Analysis tools to discover differences
  - Editing tools to merge field edits
- **Use Geodatabase and GeoProcessing to manage data distribution and integration workflows**
  - Use views and event tables
  - Re-create relationships for flattened data
  - Batch load data into other systems

*Enterprises can easily manage collection workflows...*

# Re-provisioning workflows

## *Data management for mobile*

- **Understand needs to re-provision existing datasets**
  - **Data management workflow**
    - Define interval for full cache update
    - Extract cache once and deploy to many
    - Use third party system to copy cache onto devices
    - Each morning before teams go to field
  - **Operational picture workflow**
    - Update specific operational layers
    - Let field workers refresh as desired
    - Scale servers to handle increasing data loads

*Enterprises can easily manage data refresh...*

# ArcGIS Mobile

## Demonstrations

# Best Practices for a successful mobile application

## *Patterns for Mobile Maps*

- **Base Data**
  - Background data
  - Read or visual only
  - Static
- **Operational Data**
  - Data used daily by your field staff
  - Searchable, Query-able
  - Changes frequently
- **Dynamic Data**
  - Data used to drive daily work
  - Editable
  - Changes very frequently

*Think about your mobile data needs in these three categories*

# Best Practices for a successful mobile application

## *Design your Database for Field Operations - Feature Classes*

- **Field Operations Layers**
  - Inspection Layers
  - Change Layers
  - Data from other systems
- **Generalized Data**
  - Simplify geometry
  - Remove or hide unneeded fields
  - Shrink the cache size
- **Field Versions of Data**
  - Pre-calculated Attribute Data
  - Use Views to combine data
  - Merged or split data
    - Better labels and caching
  - Match all spatial references

*Design for the issue you are trying to solve*

# Best Practices for a successful mobile application

*Pick the best format for your layers – Cached vs SDC*

- **Cached**
  - Searchable, Editable, Query-able
  - One cache file for each layer in the MXD
  - Updated through map service
- **SDC**
  - Visible only
  - Acts as one layer in the TOC
  - Deployed as a package
- **You can combine the two**
  - Cannot intertwine Cache and SDC

*Think about the data needs for the future and plan for them*

# Best Practices for a successful mobile application

*Design you Map for field crews, not the internet – Layers in a MXD*

- **Colors**
  - Sunlight viewable
  - High contrast
  - Reduce Transparencies
- **Labels**
  - Choice the Right Symbol - Bold Text, Tahoma Font
  - Set proper scale levels
    - Use Annotation for some base map layers
  - Don't over label your map
- **Symbols**
  - Meaningful - intuitive
  - Offset, Rotations are not supported
- **A Mobile Feature Layer honors the map's feature layer representation**

*Design maps for the field personal, do not build pretty maps*

# Best Practices for a successful mobile application

*Design you Map for your device, not your desktop - MXD*

- **Map Size**
  - Set you MXD map window to the Map Control size on your device
  - This means Resolution too
- **Match scales and text size to form factor**
  - Text and scale is drastically different on a VGA device vs SVGA vs QVGA
  - Set the proper scales to switch basemap layers
    - From overview grid to Parcel outlines to Edge of Pavement
- **Data Frame Settings**
  - Set the Max Scale
    - Limits Max Extent
    - Defines Cache Precision
  - Reference scale is not honor
  - Backcolor is not honored

*Device Resolutions and Scales are critical to a usable field map*



# Best Practices for a successful mobile application

*Build the UI for the field user, do not rebuild ArcPad or ArcGIS*

- **Large User Interface**
  - Large Buttons, controls, dropdowns, datagrids
  - High contrast text
  - Think about interacting with your app without a Stylus
- **Easy Navigation**
  - Open the proper dialog or menu based on the users action
  - Do not use a lot of menus or embedded list
  - Do not make it complex
- **Design for what is required, not what is cool**
  - Develop the tools that are required
  - Make it configurable

*Simple, easy to use User Interface are more effective*

# Best Practices for a successful mobile application

## *Implement Cache deployment best practice*

- **Build and Deploy a Cache with the Application**
  - Basemap layers at a minimum
  - Include in the installer or outside as a zip, cab, or exe
- **Use Geoprocessing to build the Cache**
  - All Layers, Dynamic Layers, Base Layers, Operational Layers
  - Build the cache on server that is not supporting live services
  - Account for Large Layers – Raster and Vector
    - Have a user submit an area to rebuild and return the built cache
- **Deploy the Cache as a package**
  - File Copy
  - FTP or HTTP
  - Third Party

*Having each user build or rebuild the cache can be costly*

# Best Practices for a successful mobile application

## *Choose you Synchronization Type*

- **Real Time**
  - Push/Pull or both
  - Requires DMZ/Externals Servers
    - Reverse Proxy
  - More IT Involvement
  - Less Management
- **ActiveSync**
  - Push/Pull or both
  - No External Servers
  - Less IT Involvement
  - More Management

*Real time is easier to management updates, but requires a more involved setup*

# Best Practices for a successful mobile application

*Deployment software can help manage a mobile workforce*

- **Build an Installer**
  - Wise
  - Setup and Deployment Project
- **Use provisioning or deployment software**
  - Click once
  - Soti
  - SMS

*Updates become easy using simple deployment technology*

# Best Practices for a successful mobile application

*Work with IT to properly secure your services and data*

- **Secure Services**
  - Windows Authentication
  - Token Based
- **Firewalls**
  - Reverse Proxy
- **Cache security**
  - Mobile Computer protection
  - Cache Encryption

*Having IT involved may change your coding practices – get them involved early on*