

ESRI Developer Summit

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Implementing ArcGIS Mobile Applications for the Enterprise



Introductions

- Who do you have presenting today?
 - Martin Copping
 - Product Manager for ArcGIS Mobile
 - Work with products, sales, marketing, and bus dev
 - Background in mobile mapping, GPS, GIS, SaaS & Cloud Solutions
 - Follow on Twitter: @mgcopping
 - #esrimobile

Schedule

- Today we will cover ArcGIS Mobile
 - Overview of technology
 - Discuss its place in the enterprise
 - Best practices and patterns
- Feel free to ask questions as we go

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 Mobile Internet for real-time data access
 - Post field data over wireless networks
 - Download maps on-demand using location
- Deploy to a wide range of devices
 - Windows Mobile and Smartphone's
 - Windows TabletPC's and Laptops
 - Apple iPhones

Extend your existing investment in GIS outside the office

Why use ArcGIS Mobile?

Many benefits to mobile GIS

- **Accurate geographic data**
 - Increase quality of map data
 - Make better decisions
- **Current business information**
 - Improve freshness of map data
 - Make rapid decisions
- **Rapid field access**
 - 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**
 - Ready to Deploy Windows Mobile & TabletPC App
 - Extensible Framework
 - .NET Software Development Kit
 - Mobile Project Center
 - 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 data model

Don't let paper rule the day...build for eas 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, iTronix, Trimble, Apple
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

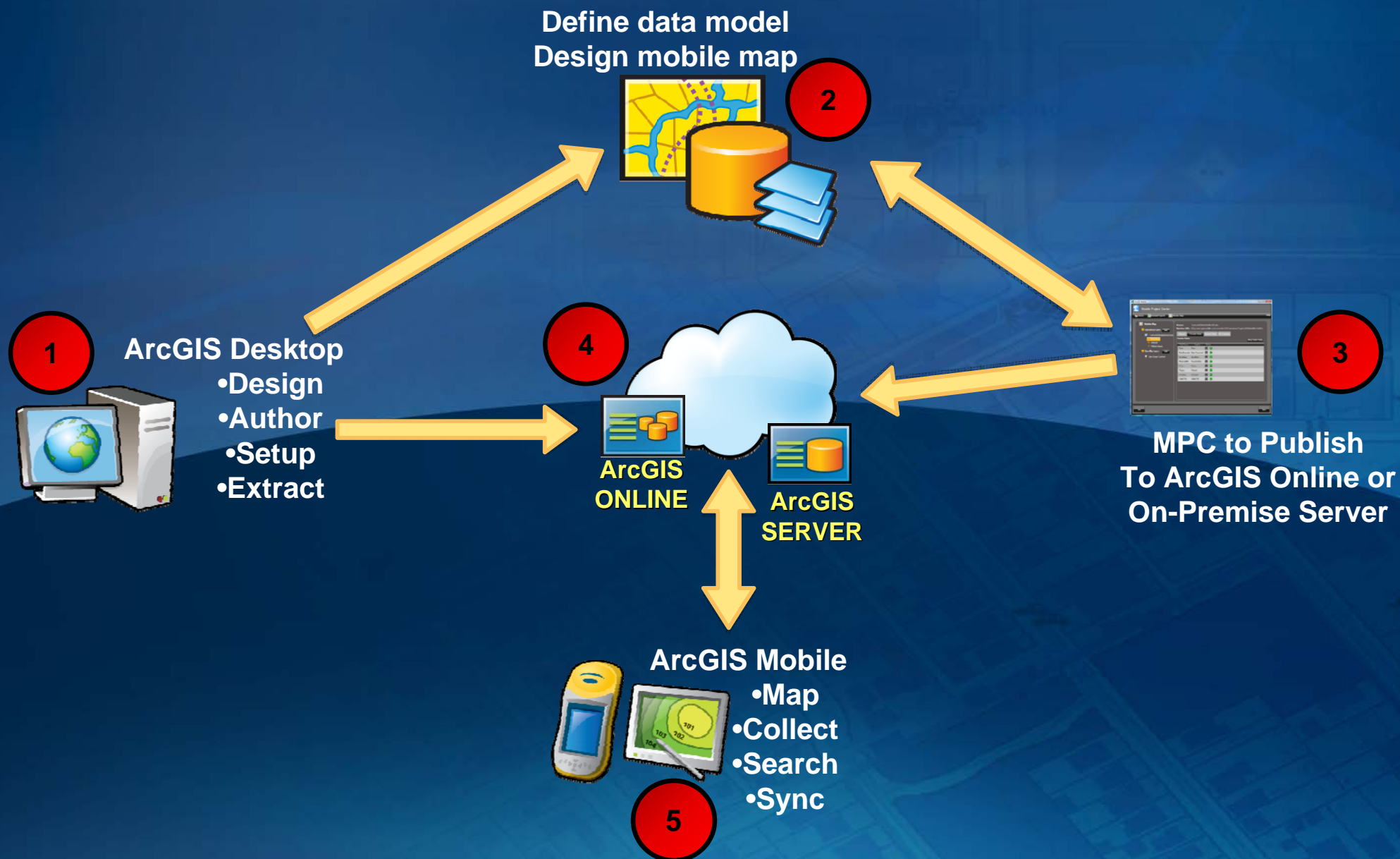
Success is often defined by field worker use...

- Need to for field worker advocacy
 - Will not accept less than adequate experiences
 - Understand capabilities of the field workers
- Focus on service level agreement
 - How robust must system be?
 - When does it need to work?
 - Strategy for fail over?

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...

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 - 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...

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...

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
 - BlueDot mCommand Center
 - Visual Studio Click Once
 - System Management Server
 - Custom web portal

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

ArcGIS Mobile 10



**Capture
Photos**



**Connected to
ArcGIS Server & ArcGIS
Online Maps/Content**



**New Mobile
Project Center**




GIS editing



**New TabletPC
Application**



**New Application
Framework**



QUESTIONS & COMMENTS