

2011 Esri Developer Summit

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Deploying ArcGIS Mobile across the Enterprise

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Product Management



Schedule

- **Today we will cover:**
 - **Mobile GIS**
 - What is it?
 - Benefits
 - **Esri Mobile Technology**
 - Overview of technology
 - ArcGIS Mobile
 - Discuss its place in the enterprise
 - **Best practices and patterns**
- **Feel free to ask questions as we go**

Please complete the session survey!

What is mobile GIS?

Extends the reach of ArcGIS from the office to the field

- With a mobile GIS solution you can
 - Carry your maps to the field
 - Collect and Update Geographic Information
 - Track and Geo-collaborate



What are the benefits of mobile GIS?

Leverages the investment of your enterprise GIS

- Improve Efficiency and Accuracy of Field Operations
- Rapid Data Collection and Seamless Data Integration
- Helps to Make Informed and Timely Decisions
- Replaces paper based work flows



What is the use case for Mobile GIS?

Common pattern in all enterprise organizations



Mobile GIS key building block in any successful GIS

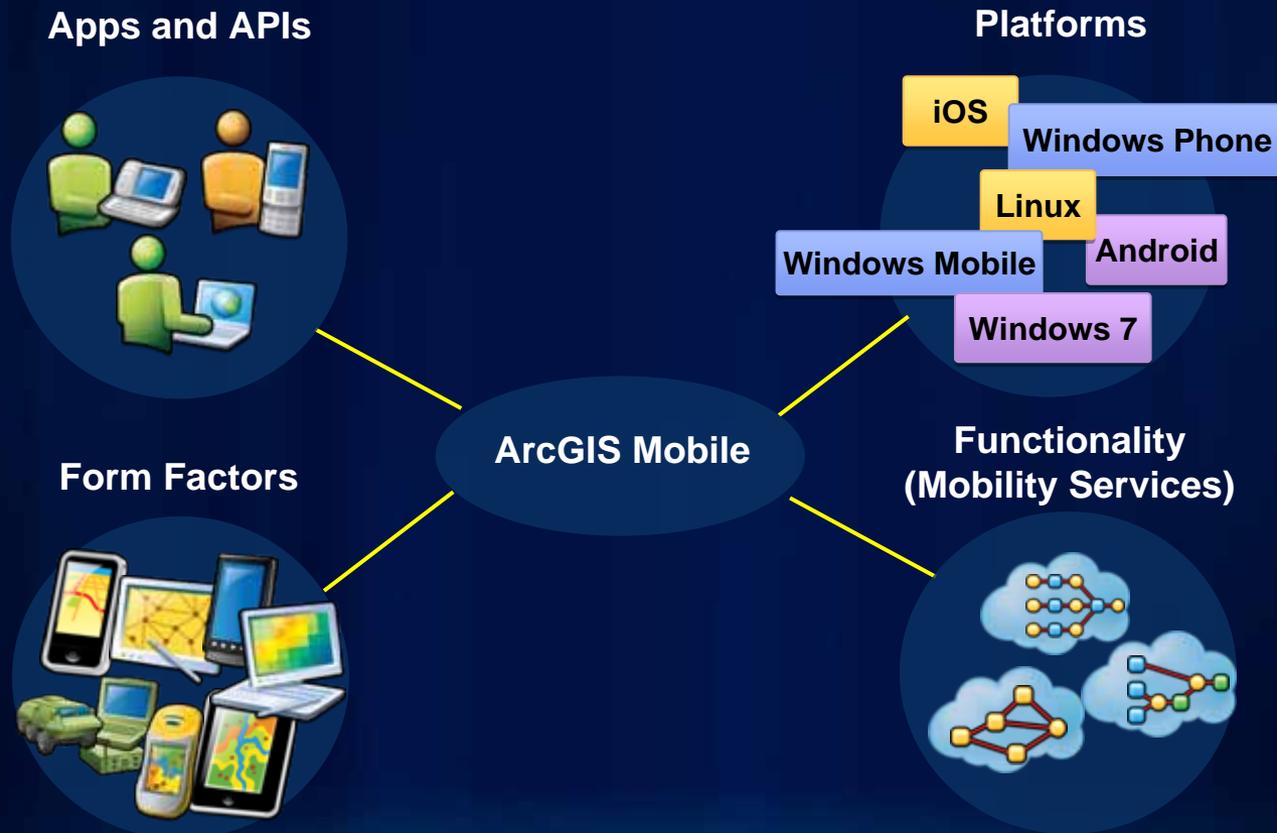
ArcGIS System



ArcGIS mobile functionality exposed through applications and APIs

Esri Mobile Technologies

Mobile capabilities of the ArcGIS system



Esri Mobile Products

ArcGIS for ...

ArcGIS Mobile

ArcPad



Rugged Devices

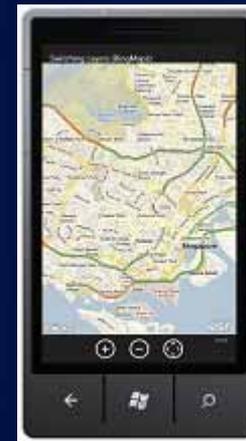
iOS



Smartphones and Slates

Android

**Microsoft
Windows Phone**



ArcGIS on Rugged Devices

Windows and Windows Mobile Devices

- Designed for harsh field conditions
- One handed/vehicle-mounted use
- Occasionally connected workflows
- High accuracy data collection
 - GPS integration
 - Laser integration
- Replace Paper Surveys
 - Intelligent forms
 - Barcode integration



Water Facilities Mapping

Asset Maintenance/Inspection

First Responders

Land Management

ArcGIS Mobile on Rugged Devices

- **Application**

- Rapid Deployment of Maps, Apps & Projects
- Task-based, Workflow Driven User Experience
- Synchronization of Data between Field & Office
- Local Caching of Data

- **API**

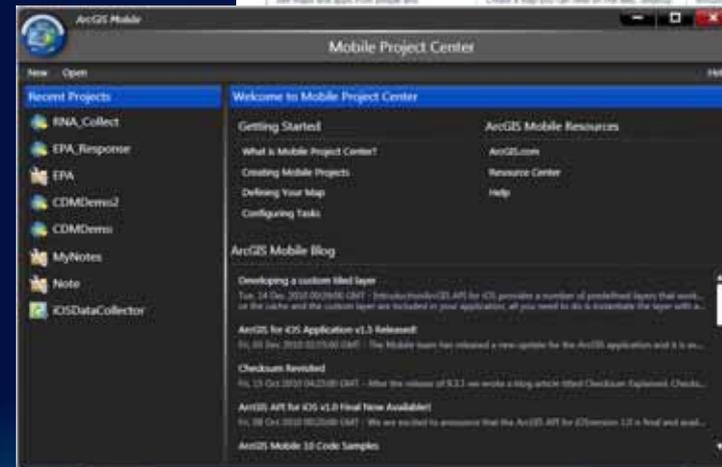
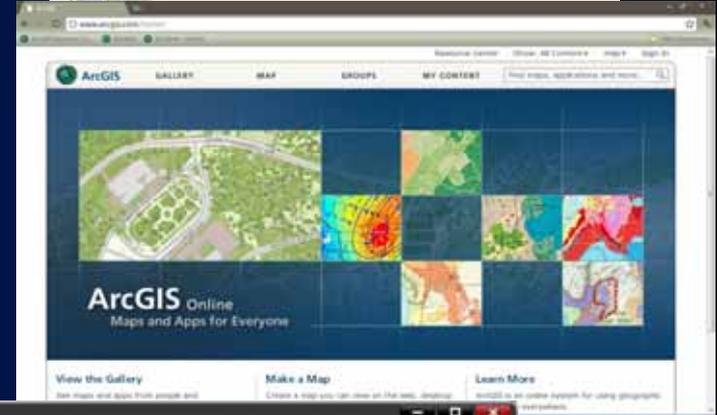
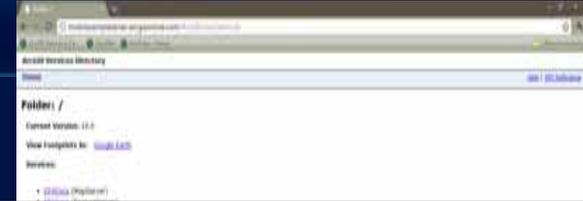
- Coarse-grained .NET API
- Build focused, custom solutions
- Extend COTS application



Mobile Project Management

Mobile Project Center...

- Create & Manage Field Applications
- Publish and share maps & content
 - Local
 - On-Premise Server
 - Cloud (ArcGIS.com)
- Provision Applications and data to field devices.

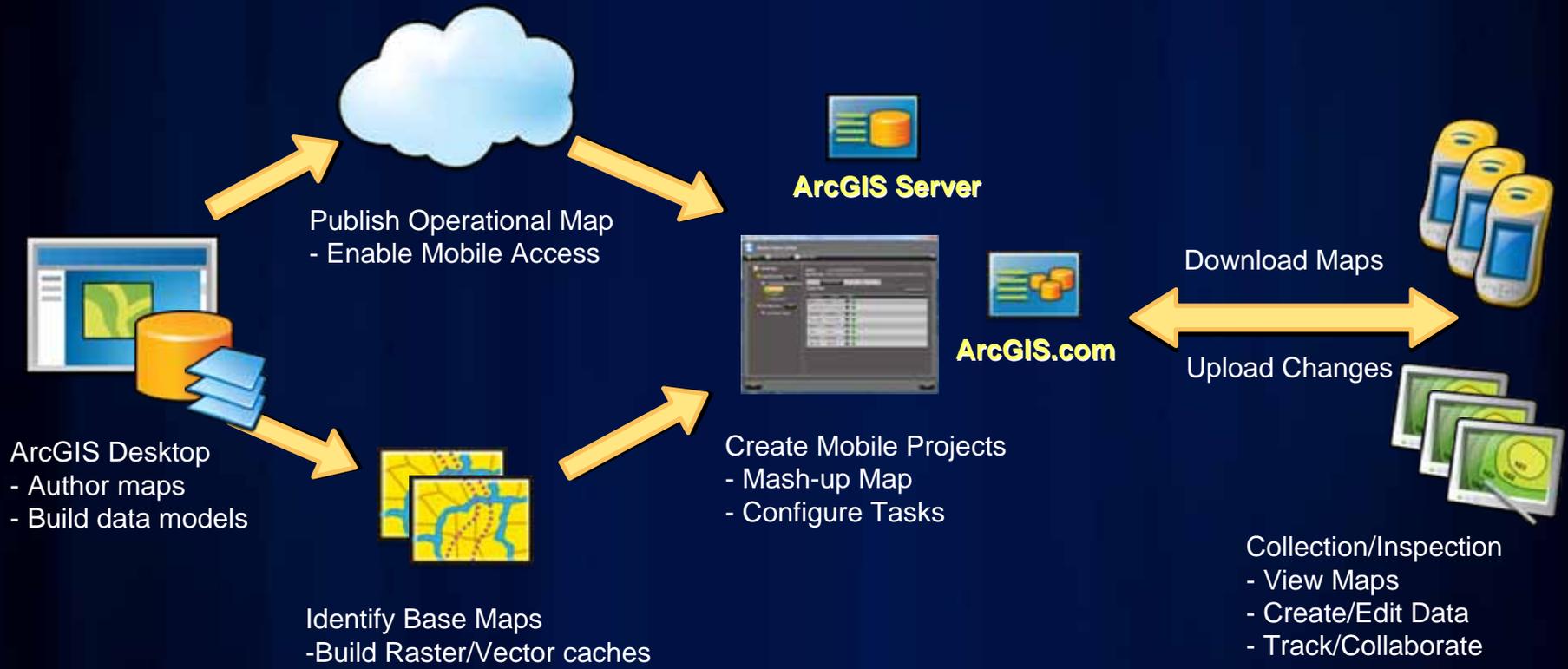


The background of the slide features a satellite map of a coastal region with green landmasses and blue water. A dark blue horizontal band across the middle contains the title text. The bottom half of the slide is decorated with a 3D effect of glowing blue and green cubes of various sizes, some of which are stacked. Faint, semi-transparent white text, including code snippets and the word 'function', is scattered across the bottom half, appearing to be part of the 3D scene.

ArcGIS Mobile Application Deployment & Workflow

Deployment & Field Workflow

Scalable Server-centric deployment



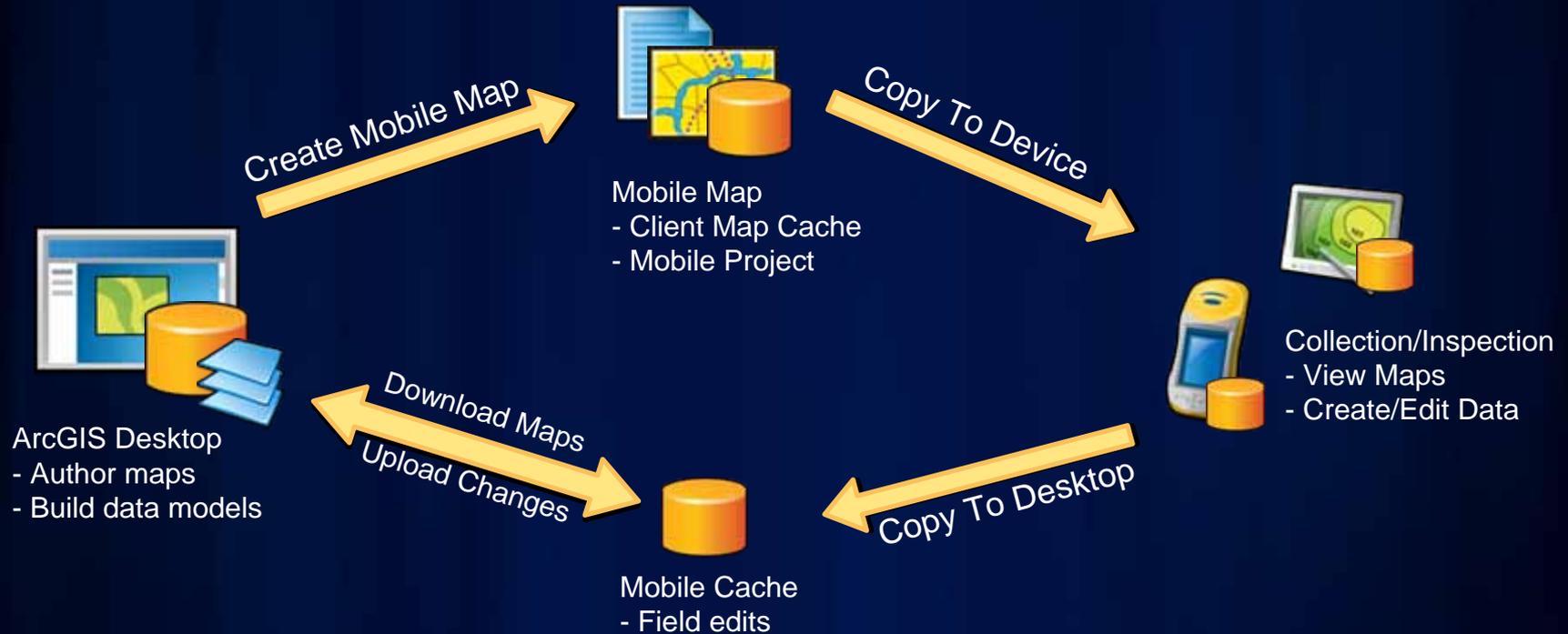
Leverage ArcGIS Desktop (New at 10 Release!)

A Pervasive Solution...

- ArcView/ArcEditor/ArcInfo Users get access to a single copy of ArcGIS Mobile
- Mobile GP Tools:
 - Create & Deploy Caches to Mobile Devices
 - Use and Edit Caches
 - Sync Field Edits on the Desktop (MXD)
- Can also be purchased in 5-Pack Bundles

Deployment & Field Workflow

Local Deployment using ArcGIS Desktop



ArcGIS Mobile SDK

Using the SDK...

- Coarse-grained .NET SDK
 - Extend field applications
 - Create focused Mobile GIS applications
 - Embed ArcGIS into existing line of business applications



- Download from Customer Care Portal
- Help and Samples location at ArcGIS Mobile Resource Center

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

The background of the slide is a dark blue map of the United States with a grid overlay. The map is partially obscured by a dark blue horizontal band across the middle. Below this band, there are several stacks of 3D rectangular blocks in light blue and green, arranged in a grid-like pattern. The text 'ArcGIS Mobile' is in white, and 'Mobile Enterprise Systems' is in yellow. There is also some faint, illegible text visible in the background, possibly related to GIS or mobile development.

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 ease 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!

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 devices
 - **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

- **BaseMap Data**
 - Background data/Read-only/Static
- **Operational Data**
 - Data used daily by your field staff
 - Searchable, Query-able
 - Changes 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
- **Field Versions of Data**
 - Pre-calculated Attribute Data
 - Match all spatial references

Design for the issue you are trying to solve

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

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

- **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 honored
 - Backcolor is not honored

Device Resolutions and Scales are critical to a usable field map

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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\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**
 - **AirWatch**
 - **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



QUESTIONS & COMMENTS