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Implementing ArcGIS Mobile Applications for the Enterprise

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Schedule

- 75 minute session
  - 60 – 65 minute lecture
  - 10 – 15 minutes Q & A following the lecture
- Cell phones and pagers

- Please complete the session survey – we take your feedback very seriously!

Topics

- Introduction to ArcGIS Mobile
- Architecture overview
  - ArcGIS Server configuration and deployment
  - Data workflows and map preparation
  - IT integration for security and management
- Application design discussion
  - User interface concepts
  - Maximizing use of SDK
  - Leveraging OS APIs
- Virginia Department of Forestry
  - Timmons Group
- Questions

ArcGIS Mobile Introduction

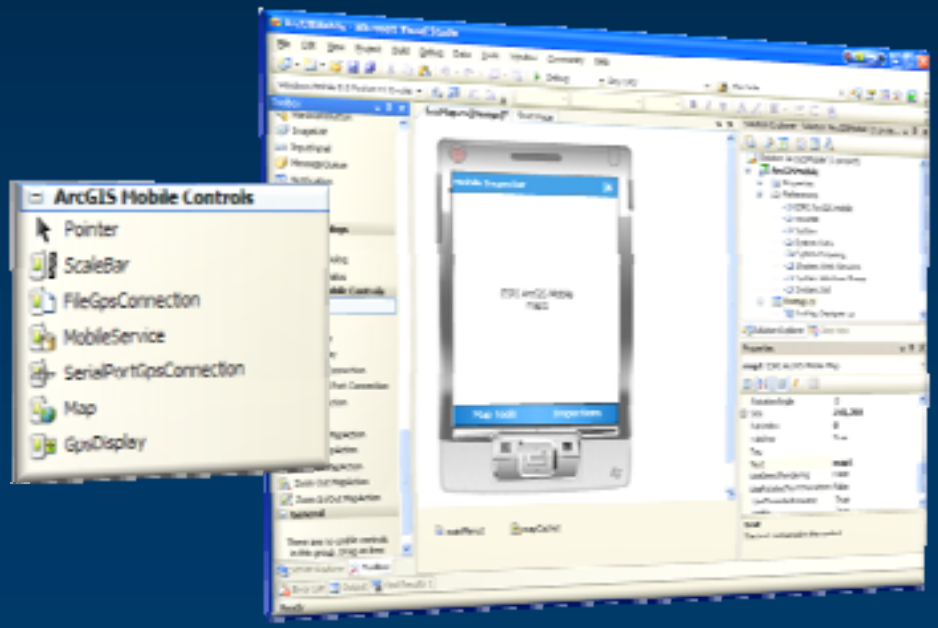
What are ArcGIS Mobile products?

- ArcGIS Mobile Application
  - Configurable mobile GIS application
  - Deployed and managed with ArcGIS Server
  - Intuitive data collection and inspection workflows
  - Designed for Windows Mobile devices
- ArcGIS Mobile SDK with runtime
  - Improved data storage
  - Increased GPS performance
  - Updated GIS editing functionality

ArcGIS Mobile SDK & Runtime

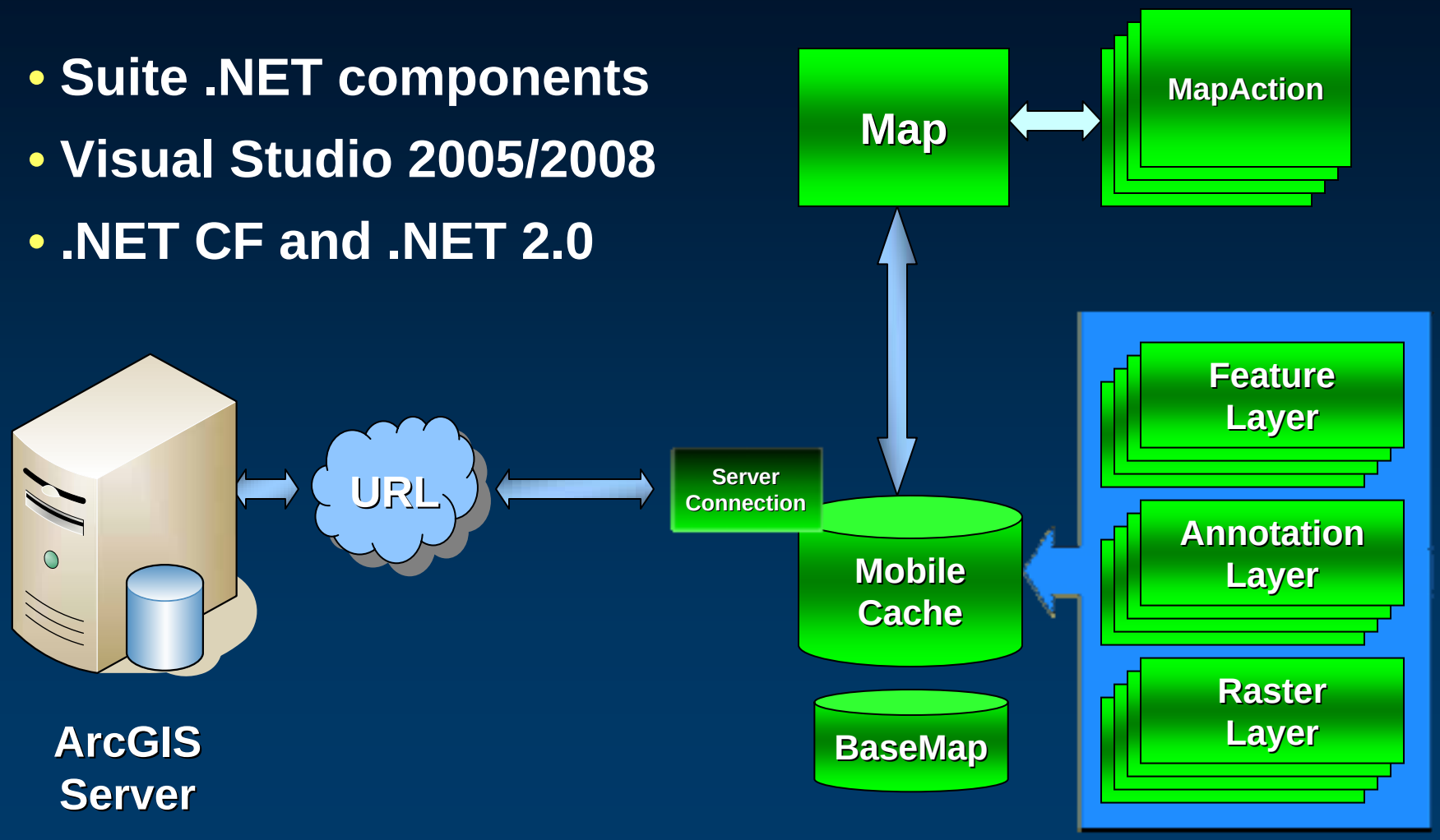
ArcGIS Mobile 9.3 SDK and Runtime

- Build mobile GIS application for ArcGIS Server
- SDK part of ArcGIS Server and EDN
- Runtime for Windows CE 5 or 6, Mobile 5 or 6 and Windows XP or Vista



ArcGIS Mobile SDK Components

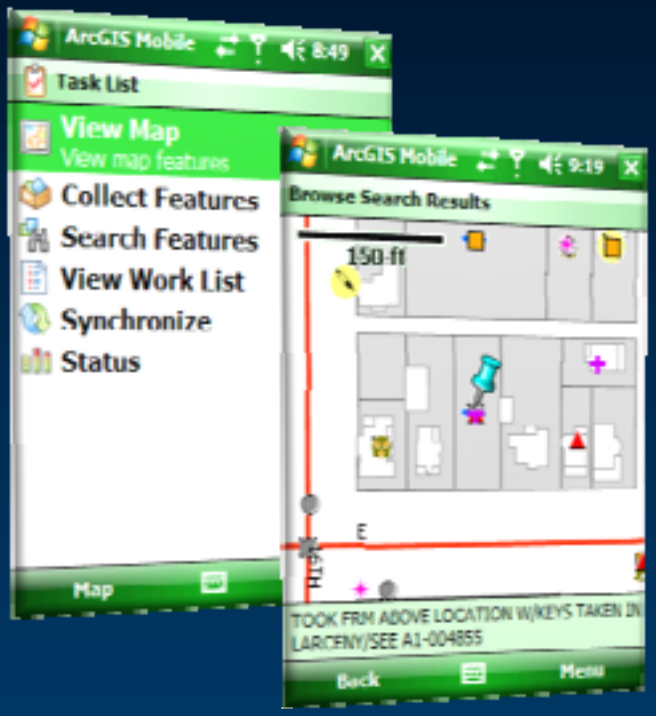
- Suite .NET components
- Visual Studio 2005/2008
- .NET CF and .NET 2.0



ArcGIS Mobile application for Windows Mobile

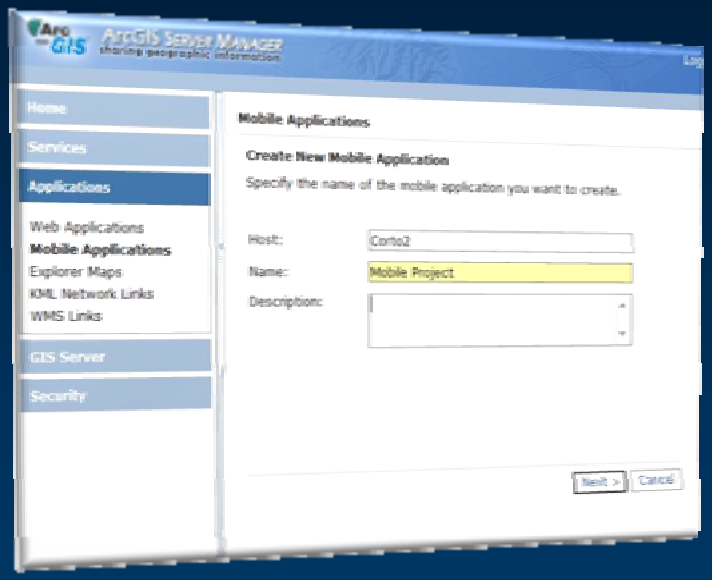
New ArcGIS Mobile Application in 9.3 !!!

- Deploy GIS tasks:
  - View and navigate maps
  - Collect new GIS features
  - Update existing GIS features
  - Synchronize with GIS Server
  - Use Global Positioning System
  - Search for GIS features
  - Manage a work list
  - Check Device Status
- Supports Windows Mobile 5 & 6 devices



Manage with ArcGIS Server

- Use ArcGIS Server Manager to:
  - Serve Mobile Maps
  - Create Mobile Projects



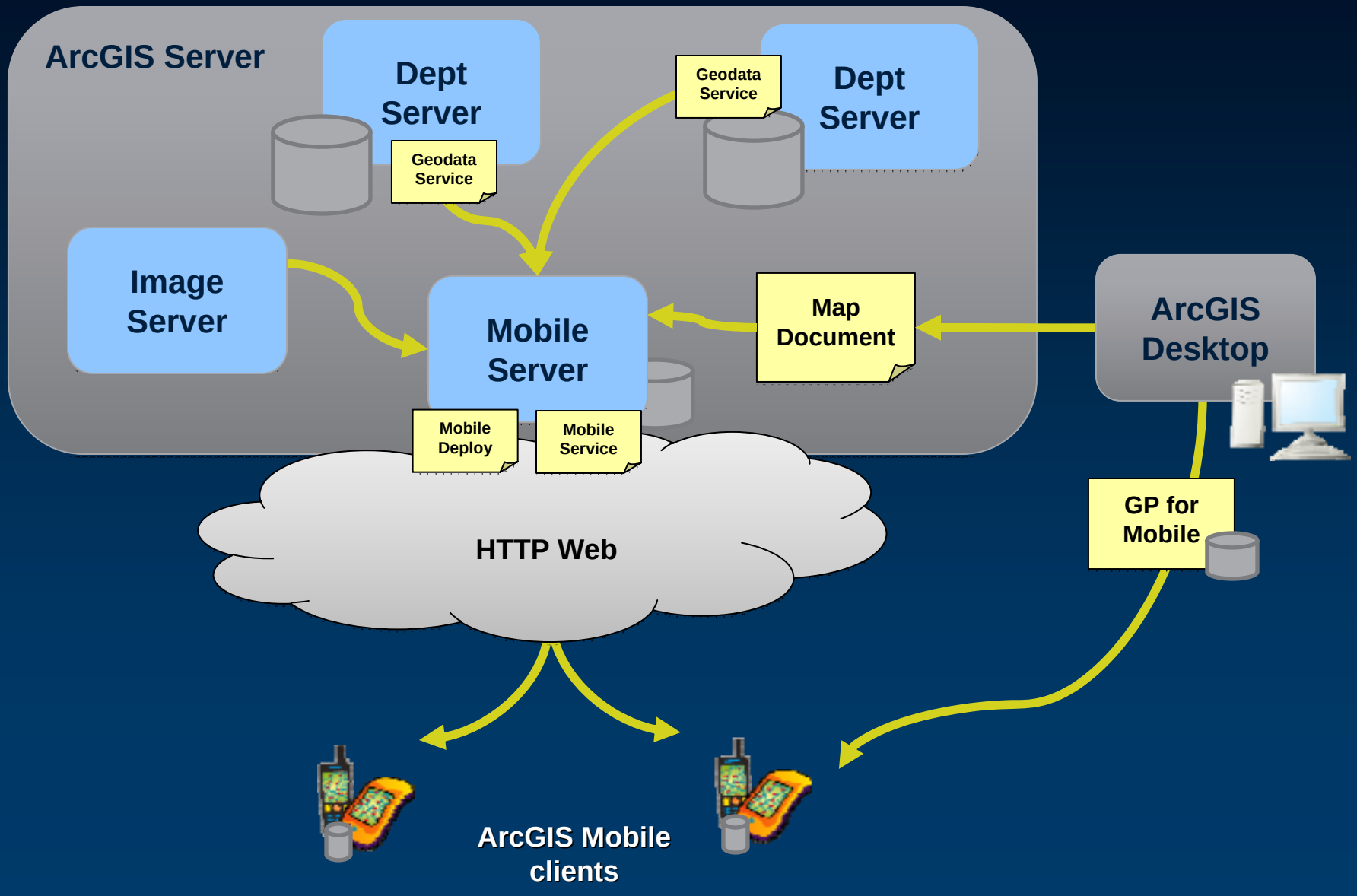
- Server Manager is a host for:
  - Mobile data access service
  - Deploy mobile application
  - Deploy mobile projects

ArcGIS Mobile Architecture

ArcGIS Mobile Architecture

- ArcGIS Mobile is designed to extend ArcGIS Server
  - Mobile data service extension of MapServer
  - Access distributed data sources behind the server
  - SDK and runtime support mobile-side caching of data
- ArcGIS Server is architected for multi-use environment
  - Production mapping server(s)
  - QA/QC Editing servers(s)
  - Imagery Server(s)
  - Mobile server(s)

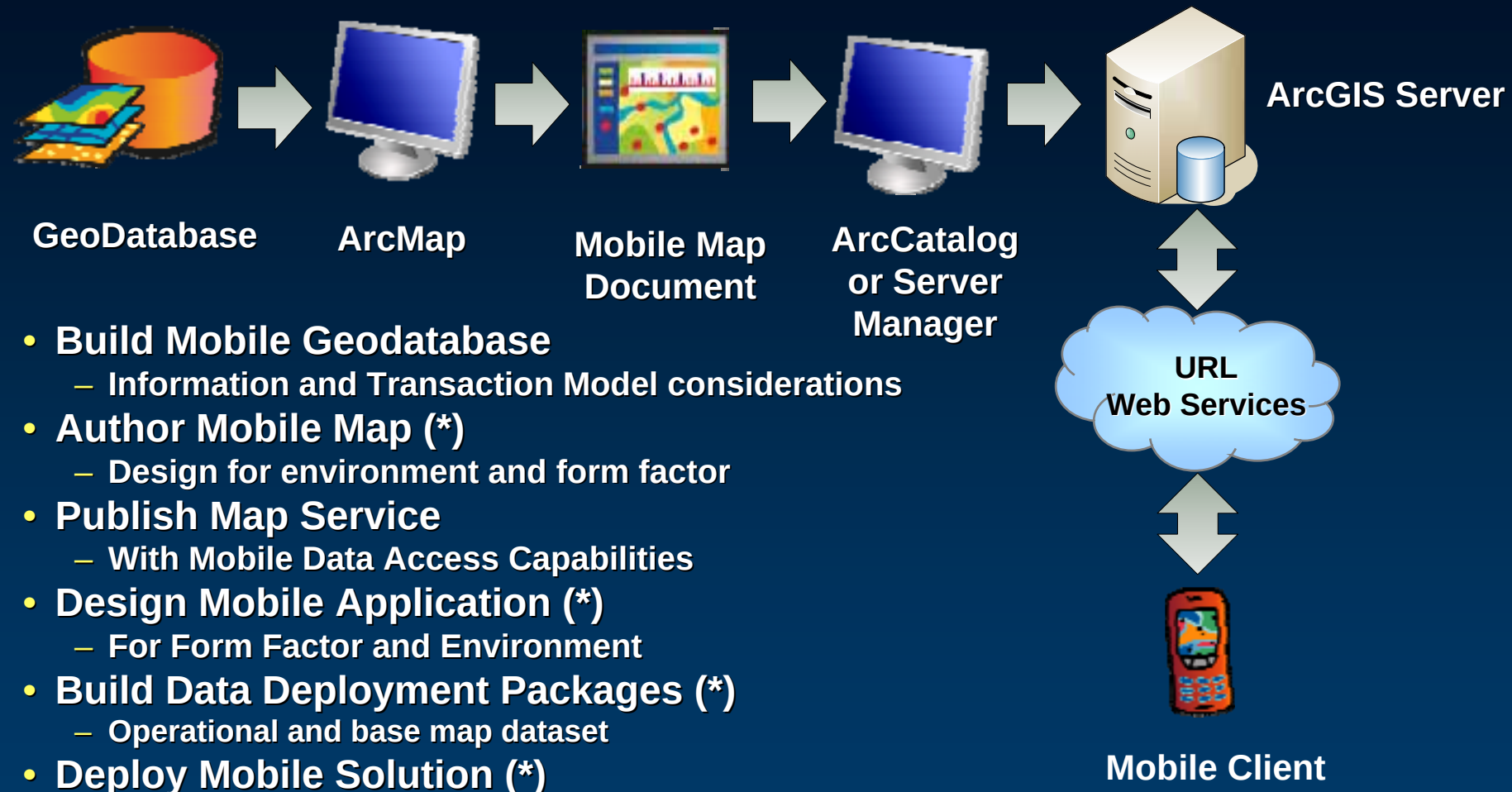
ArcGIS Mobile Architecture



ArcGIS Mobile workflow

1. Build your Mobile Geodatabase
2. Author your Mobile Map
3. Design your Mobile Application
4. Integrate with existing solutions
5. Secure server and client data
6. Serve your Mobile Service
7. Deploy your Mobile Solution
8. Operate and manage your solution

ArcGIS Server setup



- Build Mobile Geodatabase
  - Information and Transaction Model considerations
- Author Mobile Map (*)
  - Design for environment and form factor
- Publish Map Service
  - With Mobile Data Access Capabilities
- Design Mobile Application (*)
  - For Form Factor and Environment
- Build Data Deployment Packages (*)
  - Operational and base map dataset
- Deploy Mobile Solution (*)
  - Application and Data
- Synchronize Mobile GIS solution
  - Consider bandwidth and battery life

Best Practices for data

- ETL from database servers
  - Use Geodata service for replication
  - Identify distributed data sources
- Mobile data modeling
  - Extend schemas with fields
  - Create new feature classes
  - Leverage domains for wireless optimization
  - Short transaction versus versioning
- Determine Operational Data vs. Base Map Data
  - Ensure Operational data in SDE
  - Generalize geometries in background layers

Author Mobile Map

- Mobile Map Design Considerations:
  - Design for purpose
    - Remove unnecessary layers of information
    - Set scale dependency based on scales of work (walk, drive, etc)
    - Render editable layers to define feature types
  - Design for the environment
    - Establish contrast, choose meaningful symbology
  - Design for device form factor
    - Set scale dependency based on device resolution
    - Set symbol width based upon device resolution

1280x1024
BIG

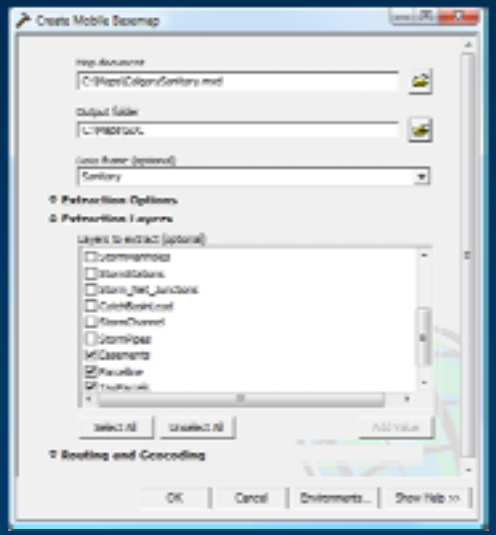
320x240
Small

Sunlight washes out Colors

Demonstration

Best Practices for extracting data

- Use Create Mobile Basemap GP tool
  - From MXD select background layers
  - Extracts layers into compressed SDC format
  - Files ready to be added to mobile device

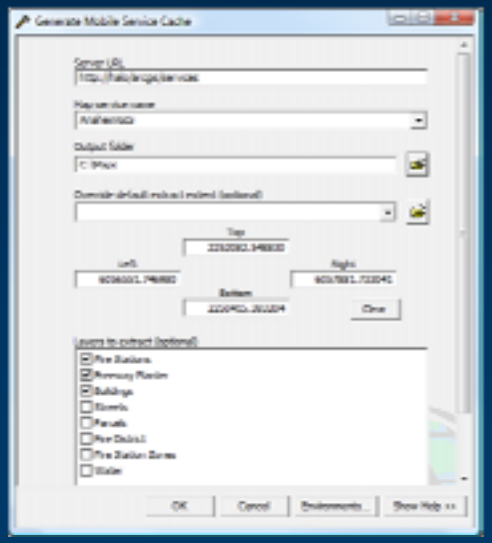


Best Practices for publishing services

- Publish mobile data access web service
  - Use ArcCatalog or Server Manager
  - Publish Map Service with Mobile data access
- Security considerations
  - Enable HTTPS
  - Use Token service
  - Web service credentials

Best Practices for extracting data

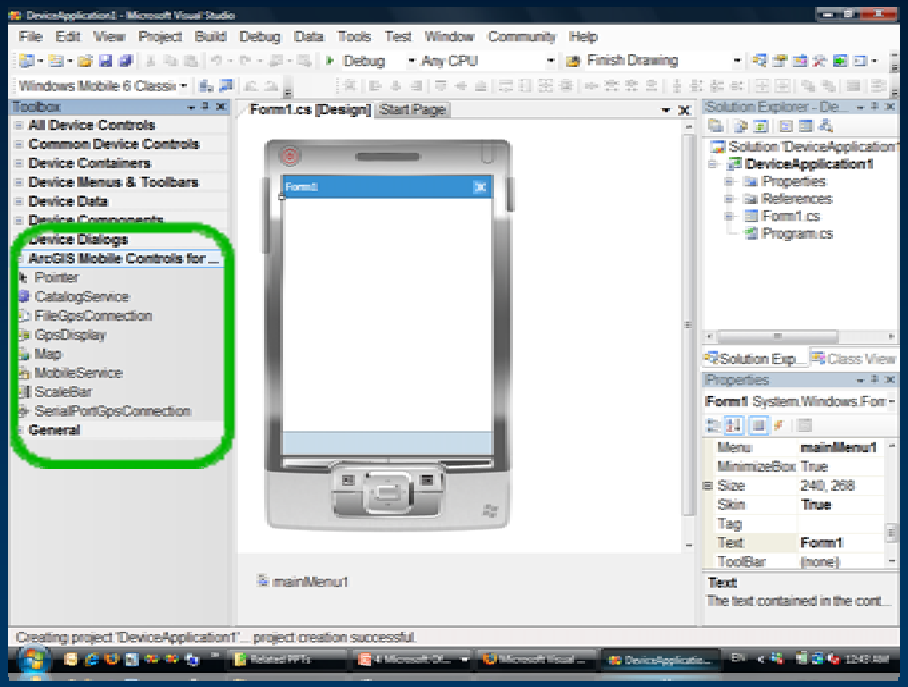
- Use Generate Mobile Service Cache
  - Creates a mobile service cache for all operational layers
  - Uses published mobile web service as input
  - Extracts vector and raster data
  - Files ready to be added to mobile device



Demonstration

Design Mobile Application

- Mobile SDK installed as part of ArcGIS Server
- Use Visual Studio 2005/2008:
  - Windows Mobile 5.0 & 6.0
  - Windows CE 5.0 & 6.0
  - Windows XP & Vista
- IDE Integration
- Build Simple and focused user interfaces
- Develop for function and form factor



Application development strategies

- Consider how application accesses data
  - Wired through activesync
  - Normadic through wifi
  - Wireless through cellular services
- Develop application include sync rules
  - Determine when an how often to pull/port data
  - Minimize use of wireless radios prolong battery life
  - Leverage System state API on Windows Mobile

Application development strategies

- Consider how application manages data and track system status at all times with System State and Notifications Broker API on Windows Mobile
  - Close Mobile Service cache in response to events
  - For example, detect battery status
  - Prevent sync when roaming to avoid data charges
  - For example, detect when in roaming state

Application development strategies

- Security is critical in certain scenarios
- Encrypt data over the air (OTA)
  - 2G wireless is 64bit versus 3G wireless is 128bit
  - Use VPN to provide full end-to-end security
- Encrypt on the device
  - Is it a concern if a device is lost?
  - Cost in hardware but risk is in losing your critical data
  - Consider using Windows Mobile Crypto API
  - Windows Mobile 6 now supports Storage Card encryption
  - There are third party tools for entire storage sytem

Application development strategies

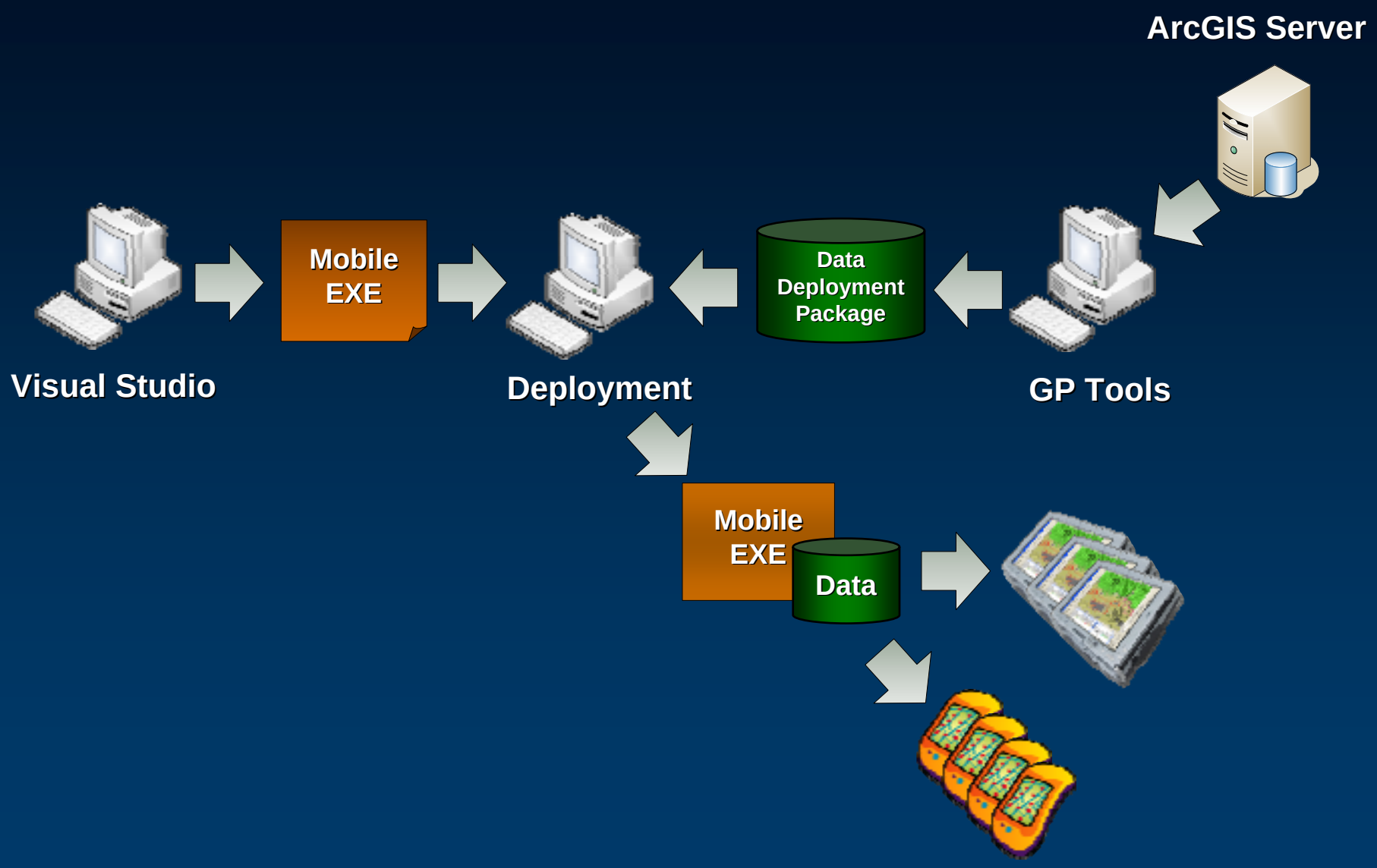
- Develop application to streamline user experience
- Develop for the primary human input
  - Rocker and menu's on Smartphone only
  - Rocker and Touch Screen on PocketPCs
  - Touch Screen and keyboard on Tablet or UMPCs
- Remove complexity of configuring a device
  - Use Configuration Service Providers
  - Integrate the management of WiFi or VPN settings
  - For example, WiFi Configuration Services Provider

.NET Compact Framework considerations

- It's a subset of .Net Framework
  - 30% of the classes/methods of the full .Net Framework
  - 4 MB minimum footprint vs. 40 MB on full .Net Framework
- Optimized for Smart Devices
- Not everything works the same
- Read the documentation

- You should use Visual Studio Emulators to develop, actual devices to test and deploy

Deploy Mobile Solution

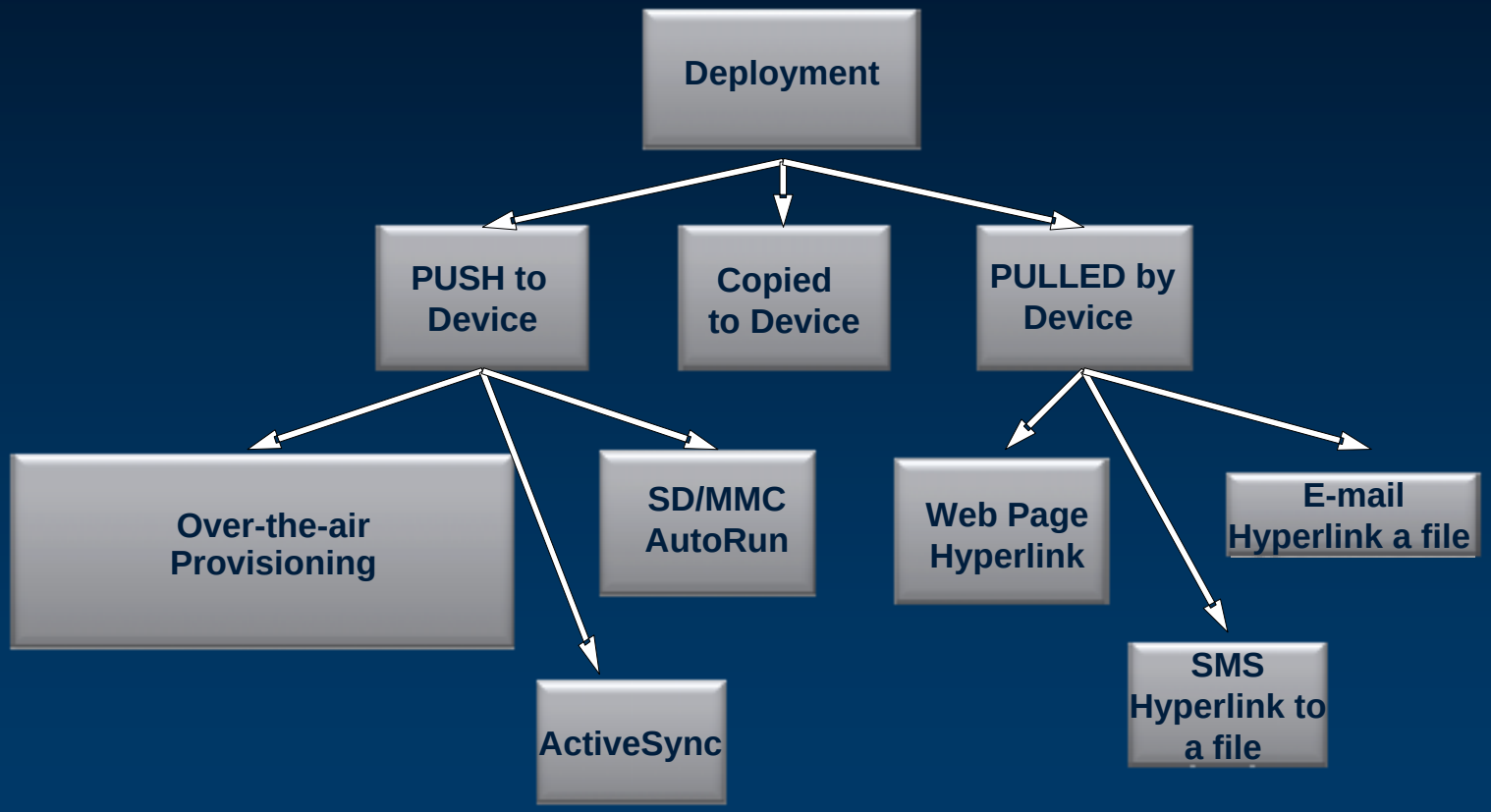


Deploy Mobile Package

- Developer shares the responsibility to deploy application and the data to the user

- Manual file deployment
  - Host Web Site with CAB URLs
- Microsoft Click Once deployment
  - Publish VS2005 project to server with IIS
- Automated Push System
  - Microsoft Mobile Device Management Center
  - SOTI MobiControl
  - Many others…

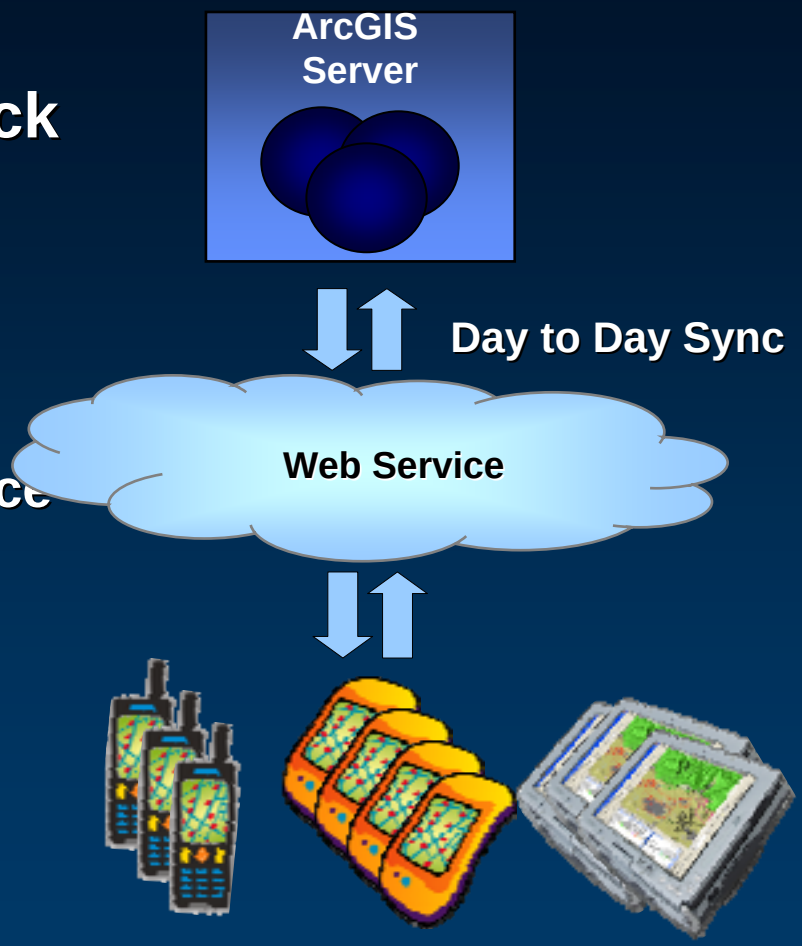
Deploy Mobile Package



Demonstration

Operate your solution

- Monitor server status and track device status at all times
- Strategy for re-provisioning
  - Cycles for updating mobile service cache and base maps
  - Cycle for updating applications
- Back-up devices ready to go
  - Devices always fail in field
  - Configured with app and data



Virginia Department Forestry
Developed by Timmons Group

Virginia Department of Forestry

- Manage 15 million acres of land ($30b value)
  - Collects data on forest acreage and ownership, GIS mapping, water monitoring, and others
- Timmons Group created Forestry Information System using ArcGIS platform
  - Implemented a Forest Protection and Mobile Computing Project
  - 200 field workers with customer ArcGIS Mobile application running on Trimble GeoXTs
  - Provides timely, efficient, and accurate geospatial data collection for forest workers

Integrated Forest Resource Information System

- Reducing paper flow increased accuracy and currency of data
- Forest info now readily available for citizens
- Bottom line?
  - Removed five paper processes
  - Cost savings of $588 000
  - ROI of 55% payback 2.5 years

Further Reading

ArcGIS Mobile

- Mobile Central on EDN
  - Mobile Blog
  - Updated Samples
  - Updated Doc
  - http://edn.esri.com/index.cfm?fa=mobile.gateway
- Training Site
  - Free ArcGIS Mobile Overview webcast
  - http://training.esri.com/acb2000/showdetl.cfm?DID=6&Product_ID=872

Mobile in General

- **Windows Mobile Blogs**
  - http://blogs.msdn.com/windowsmobile/
  - http://blogs.msdn.com/jasonlan/default.aspx
- **MSDN for Windows Mobile**
  - http://channel9.msdn.com/wiki/default.aspx/MobileDeveloper.HomePage
- **Developer Resource Kits**
  - http://msdn.microsoft.com/windowsmobile/downloads/resourcekit/default.aspx
- **TechNet Library for Windows Mobile**
  - http://technet.microsoft.com/en-us/library/cc182269.aspx

Questions