ArcGIS Field Apps:
Enterprise Deployment Strategies & Security Considerations

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@GIS_Bandit
Agenda

- Field Operations in ArcGIS
- Security strategy
- Mobile security considerations
- Deployment considerations
- Mobile Device Management (MDM)
- Deployment patterns
- Resources

Recommend:
Knowledge of ArcGIS Field Apps & ArcGIS Enterprise
Field Operations | Location-enable all phases of field work

Plan
Use location to assign and coordinate field activities

Navigate
Route to your work using your roads, your GIS data – even while offline

Coordinate
Act on real-time conditions in the field to update worker tasks

Understand
See what’s happening around you with maps

Capture
Perform data collection and send it back to the office from anywhere

Monitor
Know where workers are and see the progress of work in real-time
Common Use Cases

- Hydrant Inspections
- Map Change Requests
- Joint Use Surveys
- Damage Assessments

- Water Quality Inspections
- Permit Inspections
- Sign Inventory
- Streetlight Inventory
- Guardrail Inspections
- Census Surveys
- Mosquito Abatement
- Well Inspections
- Meter Replacement Program
- Meter Inspections
- GCP Collection
- Leak Surveys
- Debris Reporting
- Valve Inspections

- DUI Checkpoint
- SCAT Collection
- Trail Mapping
- Park and Trail Viewer
- Parcel Mapping
- Tree-trimming
- Pigging Operations
- Invasive Species Mapping
- Aquatic Surveys
ArcGIS Field Apps

- Complete suite of apps to support mobile workflows

- Workforce for ArcGIS
- Navigator for ArcGIS
- Explorer for ArcGIS
- Collector for ArcGIS
- Survey123 for ArcGIS
- ArcGIS QuickCapture
- Tracker for ArcGIS
Field Operations | How can you enable Field Operations?

Explorer is available to all user types, including Viewers

Includes Workforce, Collector, Survey123, and QuickCapture

Viewing | Editing | Authoring

Available in ArcGIS Online and Enterprise
Field Operations | How can you enable Field Operations?

Field Worker User Type

- Comes with Workforce, Collector, Survey123, and QuickCapture
- Can use Explorer

Add premium apps as needed

- Navigator
- Tracker
Security strategy
Overall Security Strategy

• Identify your security needs
  - Assess your environment
    - Datasets, systems, users
    - Data categorization and sensitivity
    - Understand your industry attacker motivation

• Understand security options
  - Enterprise-wide security mechanisms
  - Application specific options
    - ArcGIS Platform: Trust.arcgis.com

• Implement security as a business enabler
  - Improve appropriate availability of information
  - Safeguards to prevent attackers, not employees
Overall Security Strategy

Defense in Depth

• More layers does NOT guarantee more security
• Understand how layers/technologies integrate
• Simplify
• Balance People, Technology, & Operations
• Holistic approach to security
Mobile security considerations
Mobile Security Challenges

- Users are outside corporate firewall/intranet
  - To VPN or not to VPN?
- Authentication/authorization challenges
- Disconnected editing
  - Local copies of data stored on device
- Types of mobile devices
  - Corporate issue vs BYOD
- Management of mobile devices
  - Mobile Device Management
  - Mobile Application Management
  - Security Gateways
  - E.g., MobileIron, MaaS360, AirWatch, etc.
Mobile Workflow – Security Touch Points

1. Database permissions
2. Server authentication
3. Web Service authorization
4. Device access
5. Storage

HTTPs
Mobile Security Implementation Guidance

• Perform Authentication/Authorization
• Encrypt data in-transit (HTTPs) via TLS
• Encrypt data-at-rest (on device)
• Segmentation
  - Use ArcGIS Online, Cloud, or DMZ systems to disseminate public data
• Use an Enterprise Mobility Management (EMM) solution
  - Enforce encryption
  - App distribution
  - Remote wipe
  - Control 3rd party apps & jailbreak detection
  - Distribute Certificates
Deployment considerations
ArcGIS Deployment Options

**ArcGIS Enterprise**
Software you install and manage in your own infrastructure.

**ArcGIS** provides **Options for Implementing Web GIS**

**ArcGIS Online**
Software as a Service. Software is managed by Esri on Esri’s cloud infrastructure.
ArcGIS Platform Deployments

• ArcGIS Online
  - Esri managed infrastructure

• ArcGIS Enterprise
  - Focus on the Base ArcGIS Enterprise deployment
  - Lots of deployment configurations

• Key terms:
  1. Authentication → verify user identity
  2. Authorization → which resources the user can access
ArcGIS Online Authentication

• 3 options:
  1. Built-in security (ArcGIS accounts)
  2. Social logins
     - Google or Facebook account
  3. Enterprise logins with SAML
     - Use 3rd party Identity Provider (IDP) to authenticate
ArcGIS Online Authorization

- ArcGIS Field Apps honor the security model enabled in ArcGIS Online
- Leverage Groups and Roles to control access to content

- Portal security is handled at the item level
- Portal items are shared at the group level
Design Groups with Security in Mind

**Security best practice:** Make rigorous use of portal groups, and only share sensitive items at the group level
ArcGIS Online Compliance

• ArcGIS Online meets several security compliance standards
ArcGIS Enterprise

- Software that enables Web GIS within your own infrastructure
- Base ArcGIS Enterprise deployment
ArcGIS Enterprise Authentication

• 4 options:
  1. Built-in security (ArcGIS accounts)
  2. Enterprise logins web-tier authentication
     - Integrated Windows Authentication (IWA), PKI
     - LDAP (Basic, Digest, PKI)
  3. Enterprise logins portal-tier authentication
     - Windows Active Directory, LDAP
  4. Enterprise logins with SAML
Enterprise Logins Web-Tier Authentication

- Common in a Microsoft Windows environment
- Enables a single-sign on user experience
- Leverages the ArcGIS Web Adaptor
- Supports username/password or PKI/Smart Card authentication
Enterprise Logins Portal-Tier Authentication

- Configure Portal for ArcGIS with your user identity store
- Supports built-in and enterprise users
  - Either Windows Active Directory or LDAP users
- Enable ArcGIS Web Adaptor for anonymous access
SAML Authentication

- Ideal for organizations that already have a SAML identity provider (IDP)
- Allows multi-factor authentication if desired
- Supports both built-in and enterprise users
ArcGIS Enterprise Authorization

- ArcGIS Field Apps honor the security model enabled in Portal for ArcGIS
- Leverage Groups and Roles to control access to content

- Portal security is handled at the item level
- Portal items are shared at the group level
Mobile Device Management (MDM)
Mobile Device Management (MDM) Technology

• Software that IT administrators use to control, secure and enforce policies on smartphones, tablets and other endpoints

• Optimize the functionality and security of mobile devices within the enterprise, while simultaneously protecting the corporate network

• Security policies configured via MDM management console
  - Server pushes those policies over the air to the MDM agent on the device
Benefits of MDM Technology

- Easily manage devices in your organization
- Keeps apps and data secure
- Helps with BYOD management and policies
- Active monitoring for malware and other threats
- Makes app deployments more efficient, saves time

- Typically part of an organization’s larger Enterprise Mobility Management strategy
MDM and ArcGIS Field Apps

- Esri currently working with 4 different cloud based MDM solutions for app development and testing purposes
MDM Example Consoles
MDM Use Cases

- **Per App VPN**
  - Connect to your VPN to access internal resources when your apps open
- **App Config**
  - Preconfigure and apply settings to the apps on your devices
- **App Management**
  - Manage the version of apps deployed to your devices
MDM with Apps
Philip Wilson & Heather McCracken
Demo Recap

1. Used AirWatch MDM
2. Deployed Collector for ArcGIS to iOS device
3. Managed App Config
   - Apply portalURL to Collector app
4. Navigator for ArcGIS deployed with perApp VPN
ArcGIS Field Apps support for MDM

- Working on supporting the AppConfig Community
  - [https://www.appconfig.org/](https://www.appconfig.org/)

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Mobile deployment patterns

With ArcGIS Enterprise
On-Premises Deployment Patterns

- **Reverse Proxy**
  - Pros
    - Lowest cost
    - More authentication options
  - Cons
    - Higher risk, web requests proxied through DMZ
    - Semi-trusted users needed to manage AD/LDAP
On-Premises Deployment Patterns

• Virtual Private Network (VPN)
  • Pros
    - Low cost compared to security gateway option
    - More authentication options
    - All data stored in organization
  • Cons
    - IT Dept needs to enable and maintain a VPN service
    - All users must use VPN to access
    - Mobile traffic routed through VPN
    - Need VPN technical expertise
On-Premises Deployment Patterns

• Mobile Security Gateway
  • Pros
    - Users not dependent on corporate VPN
    - Can use MDM technology
  • Cons
    - Higher cost
    - Need to deploy MDM technology
    - IT Dept needs to enable and maintain MDM technology
    - Need MDM technical expertise
Hybrid Deployment Patterns

ArcGIS Mobile Apps

ArcGIS Online
*Non-sensitive data*

Portal for ArcGIS

ArcGIS Server

ArcGIS Data Store

ArcGIS Online
*Sensitive data*

ArcGIS Mobile Apps

ArcGIS Server

*Sensitive data are registered as ArcGIS Online items*
Security Technical Sessions

- **ArcGIS Enterprise: SSL Considerations**
  Tues July 9  1:00 – 2:00 pm

- **Build Security into Your System**
  Tues July 9  1:30 – 1:50 pm

- **ArcGIS Online: An Introduction to Security, Privacy, & Compliance**
  Tues July 9  2:30 – 3:30 pm  
  Wed July 10  4:00 – 5:00 pm

- **Designing an Enterprise GIS Security Strategy**
  Wed July 10  8:30 – 9:30 am

- **ArcGIS Enterprise: Security Integration**
  Thurs July 11  10:00 – 11:00 am
Resources

• Blogs
  - Mobile Application Management and Esri's Field Apps
  - Navigator supports enhanced security – and it’s configurable with your MDM!

• Whitepaper: ArcGIS Secure Mobile Implementation Patterns
Summary

- Field Operations in ArcGIS
- Security strategy
- Mobile security considerations
- Deployment considerations
- Mobile Device Management (MDM)
- Deployment patterns
- Questions?
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