Command and Control Applications

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Agenda

- Trends in Command and Control and GIS
- Use Cases
- A GIS Platform Approach to Command and Control

Trends in GIS and Command and Control

Characteristics and Trends in C2 Applications

Modernizing Command and Control

CHARACTERISTICS

Networks

Distributed Services

Identity

Security

Real-Time

Connected/Disconnected

Bandwidth

Time-Sensitive

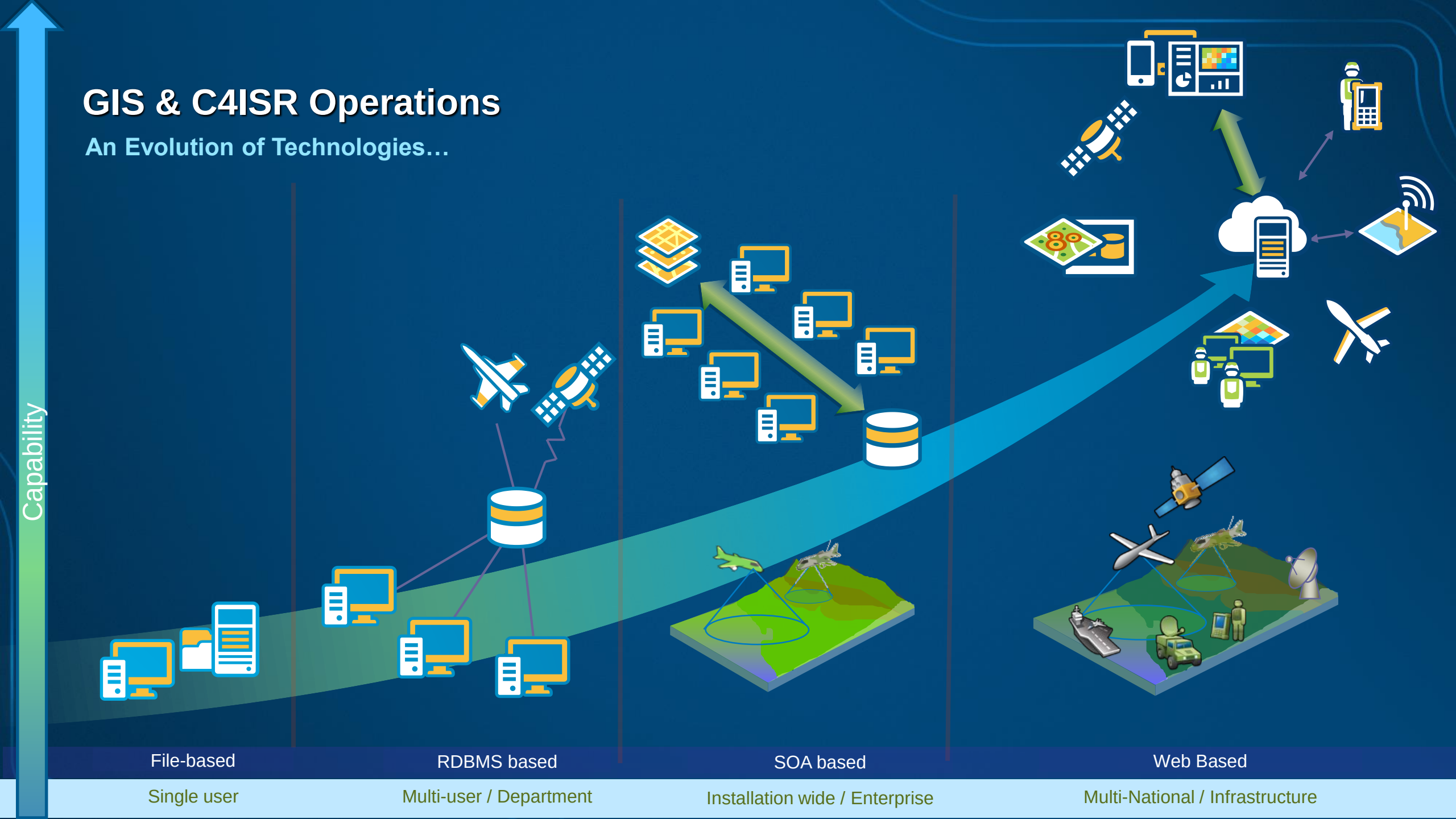
Multi-National Deployments

TRENDS

Client / Server	Web Services / SOA
Stovepiped Systems	Seamlessly Integrated Systems
Unconsolidated Infrastructure	Cloud and Elastic Computing
Physical Servers	Virtualization and Data Centers
Information Overload	Relevant Pictures
Proprietary Data	Open Data & Shared Services
Reactive Analysis	Predictive Analysis
‘One Size Fits All’ Applications	Lightweight Reusable Apps
Complex User Interfaces	Intuitive User Experiences
Long Development Cycles	Short Iterations
Risk Averse	Risk Aware

GIS & C4ISR Operations

An Evolution of Technologies…



Web GIS Is a Transformational Architecture

Opening, Integrating and Simplifying Everything

Web GIS

System of Engagement

Desktop

Apps

Systems of Record

Server

Web Maps

Web Scenes

Layers

Distributed Services

Bringing Together Your Existing Systems . . .
and Creating a System of Engagement

Web GIS Supports Multiple Missions

Integrating Organizations and People

Enabling Sharing, Collaboration, and Decisive Action

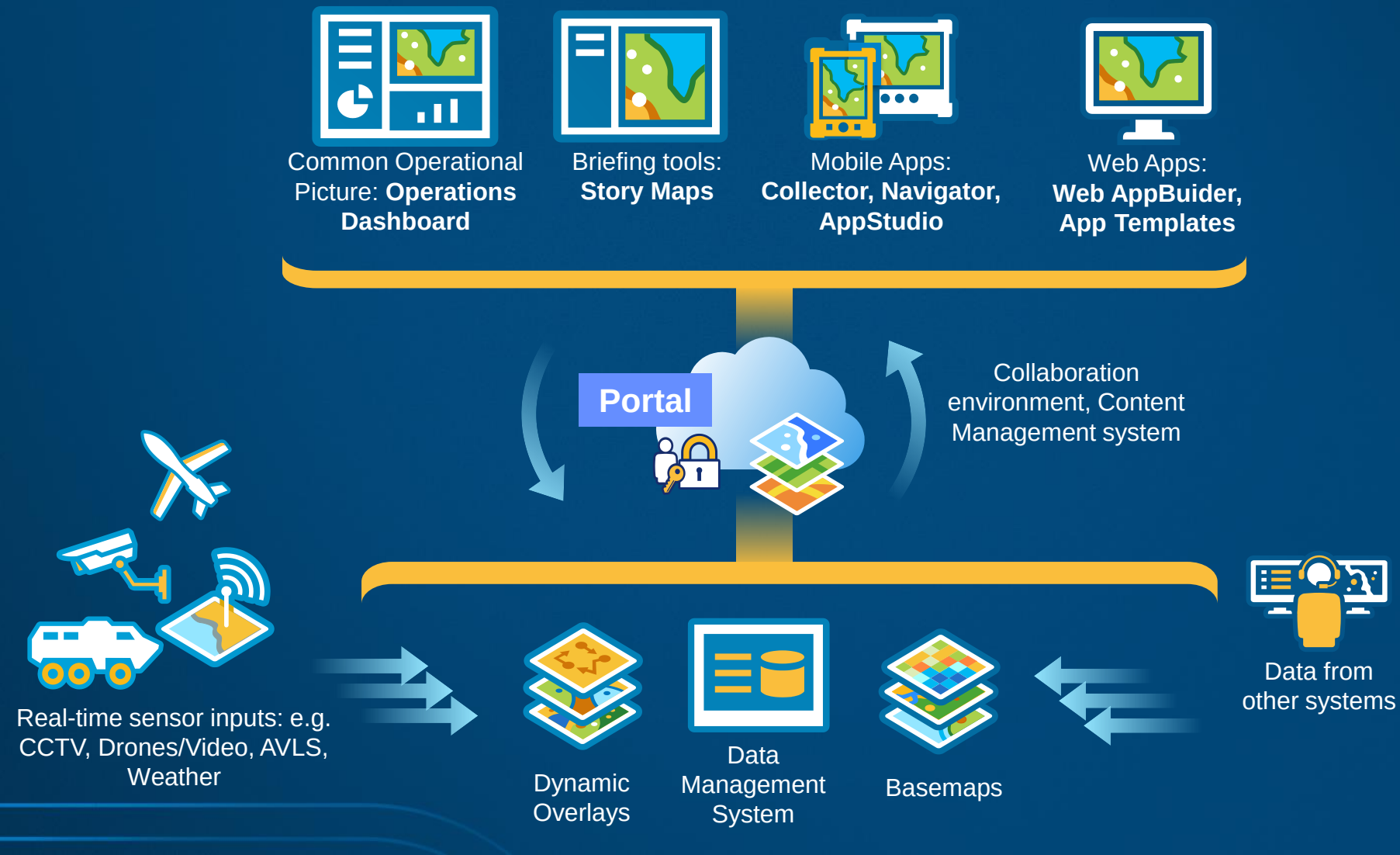
What can the ArcGIS Platform bring to Command and Control?

Integrate and exploit existing investments in data and infrastructure

Collect… Analyse… Share… Act…

An Initial Operating Capability through Lightweight, Reusable Apps

Delivering essential capabilities right away



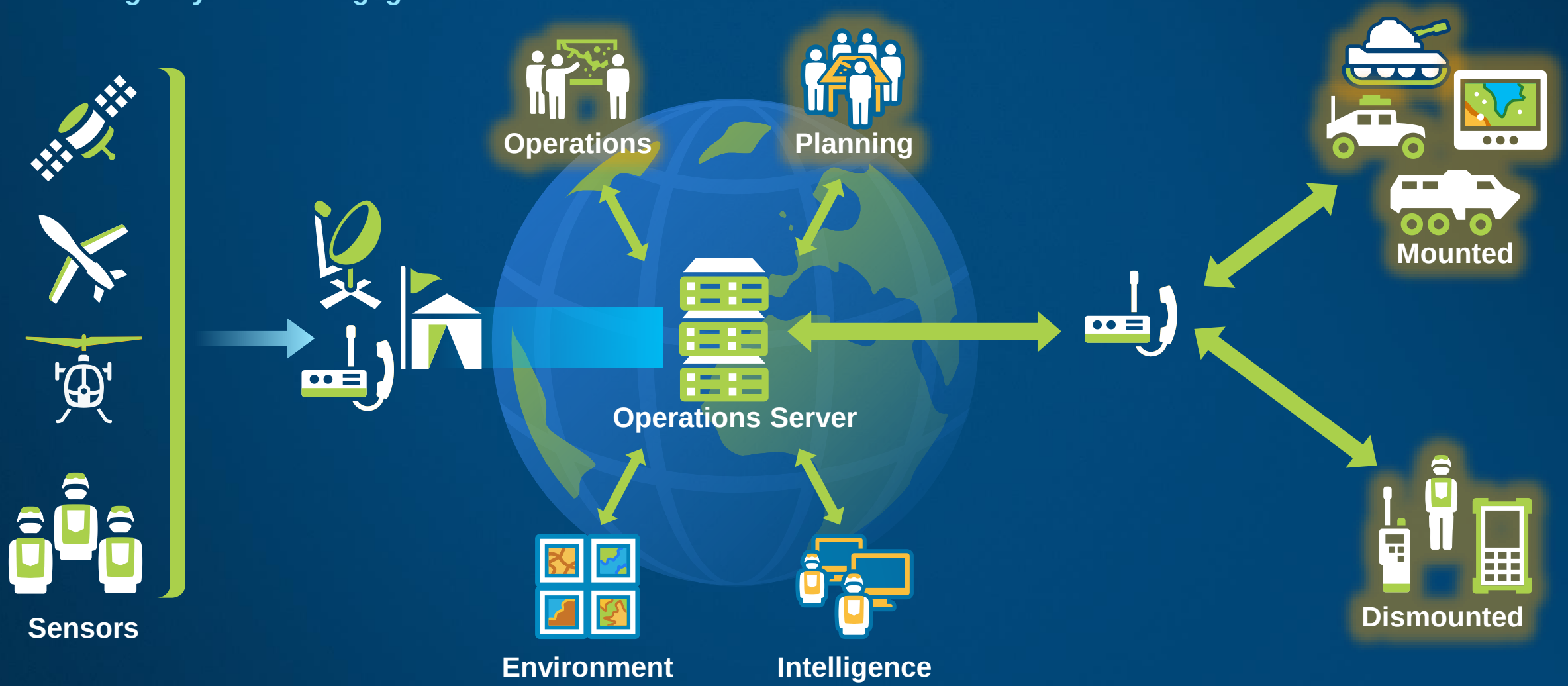
Use Cases

A Platform Approach to Military Operations

Enabling a System of Engagement for Command and Control

A Platform Approach to Military Operations

Enabling a System of Engagement for Command and Control



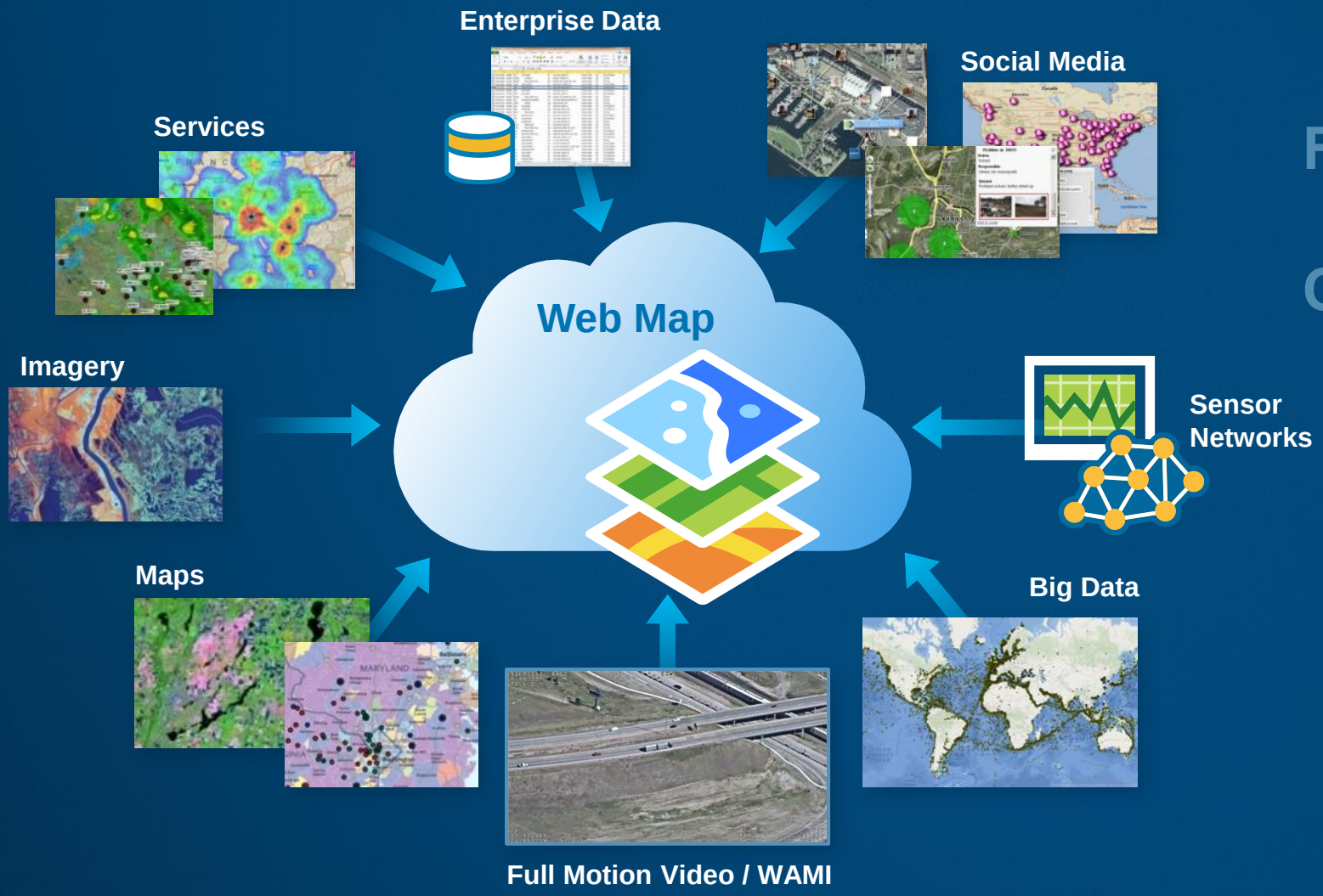
A GIS Platform Approach to Command and Control

1

Web Maps as Information Products

Web GIS Can Represent All Data Types

As Web Maps and Web Services



Foundation Data

Operational Overlays

Providing a New Medium for GIS

Web Maps

Integrate Information / Configure / Share

Source Information

- Desktop
- Spreadsheet
- Databases
- CSV
- Sensor & Real-Time Data
- 3D Data
- Basemaps
- Analytical Services

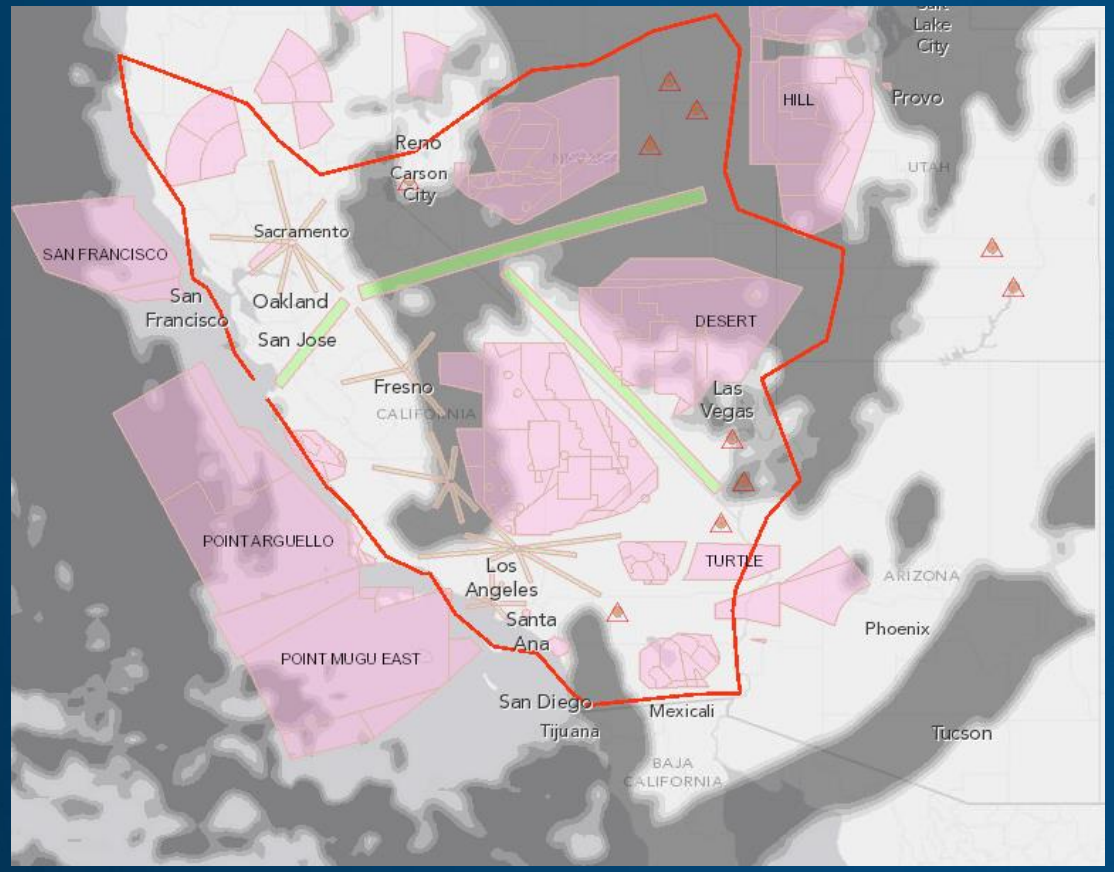
Web Map

Apps

- Dashboards
- Mobile Apps
- Web Apps

User Needs

- Current Operations
- Field Operations
- Planning and Analysis
- Briefings and Public Information



Web Maps

- Air Plan
- Current Operations

2

Real-time Analysis and Authoritative Analysis

Processing Real-Time Data Feeds At Machine Speed

From Raw Data to Actionable Information through Reporting by Exception

Sensor Monitoring

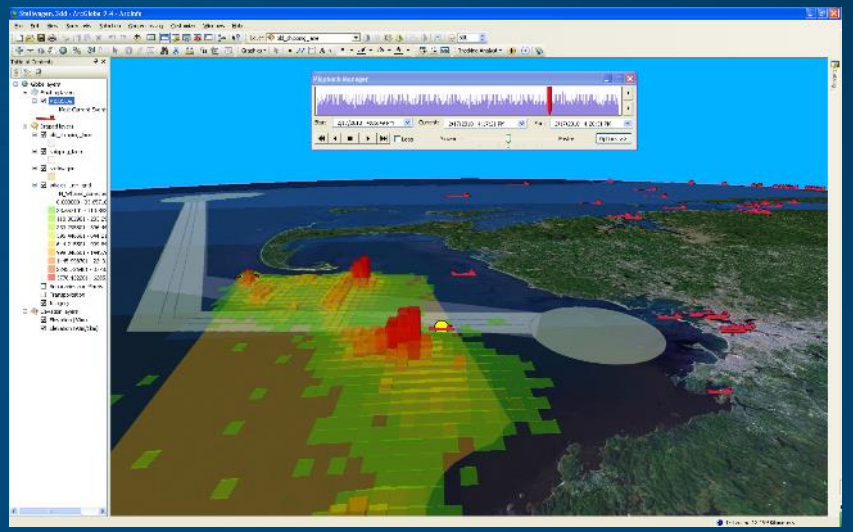
…Alert when values exceed min. or max. thresholds

Vehicle/Platform Tracking

Aircrafts in severe weather

…At risk

AIS Vessel Tracks

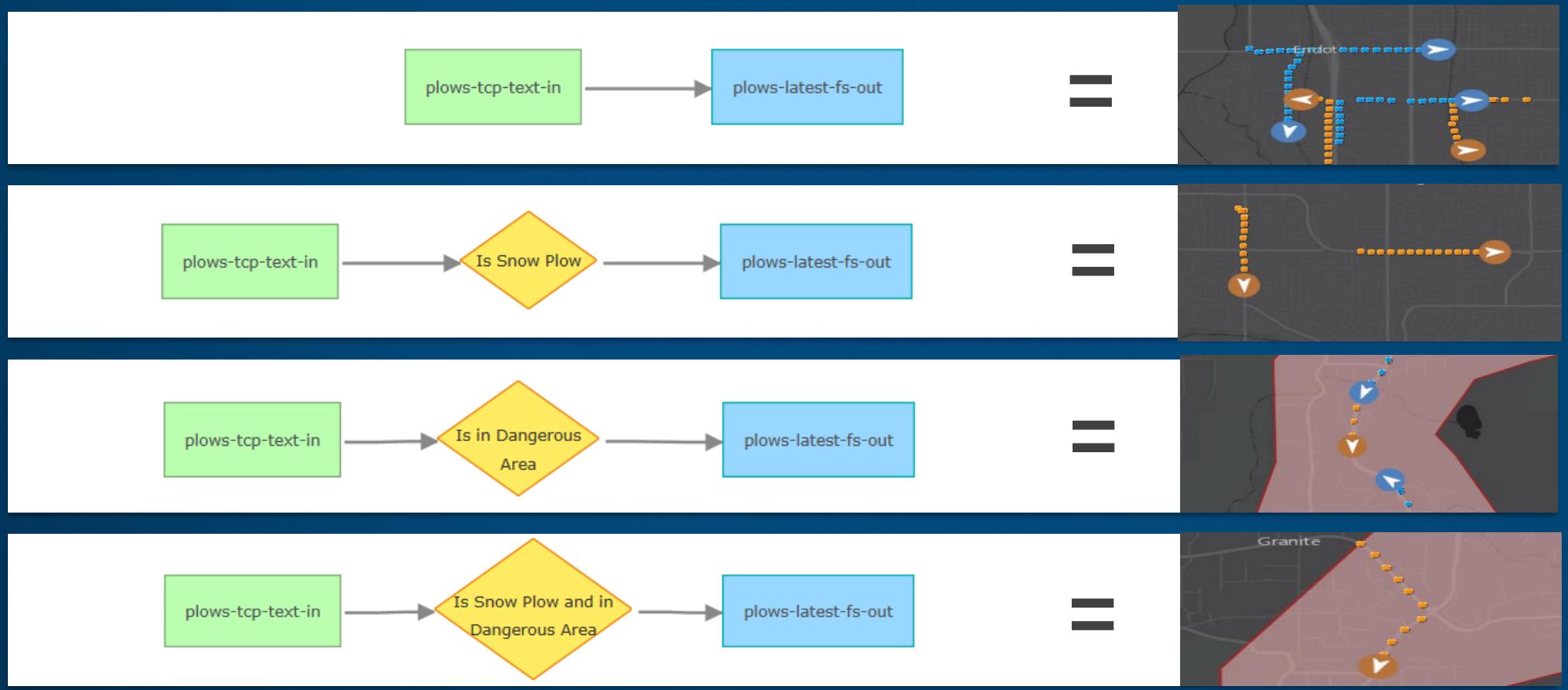


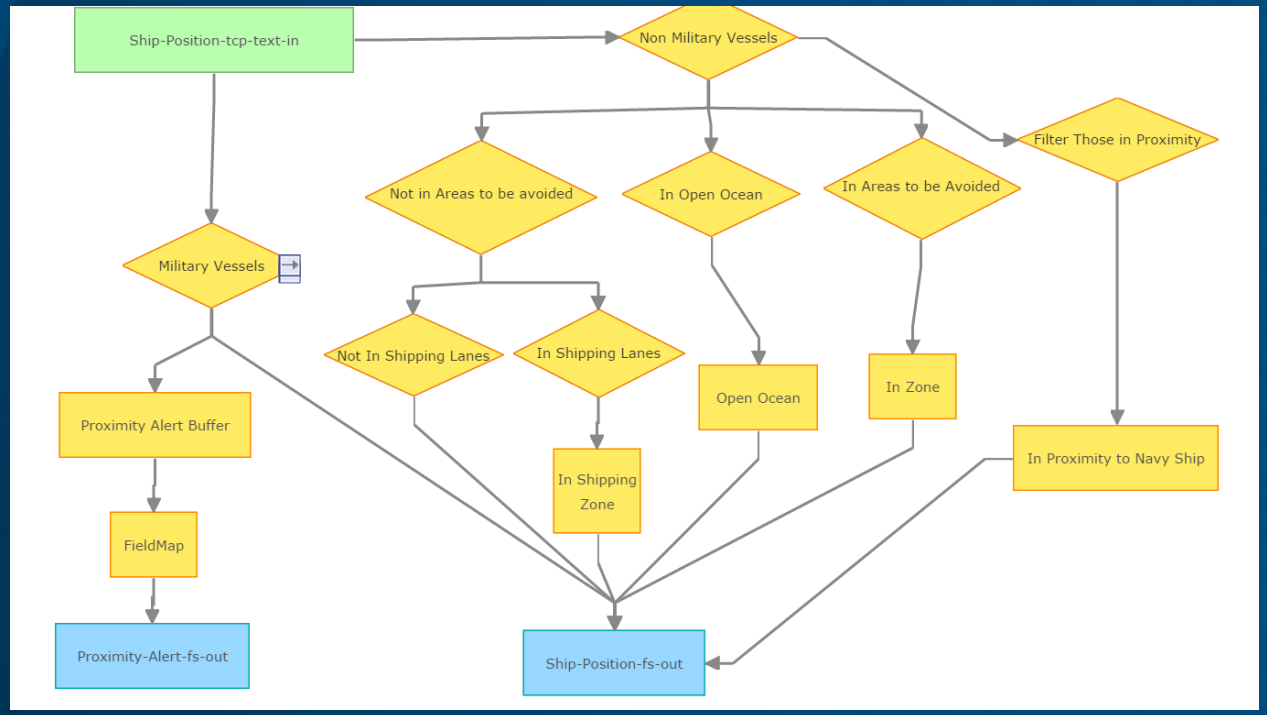
…Filtered by position and attribute e.g. slow boats that could be boarded by pirates

Applying Real-Time Analytics

GeoEvent filtering

- A **Filter** eliminates GeoEvents based on an expression





Real Time Analysis

Maritime Events (Big Data)

Air Tracks

Thinking Geospatially…

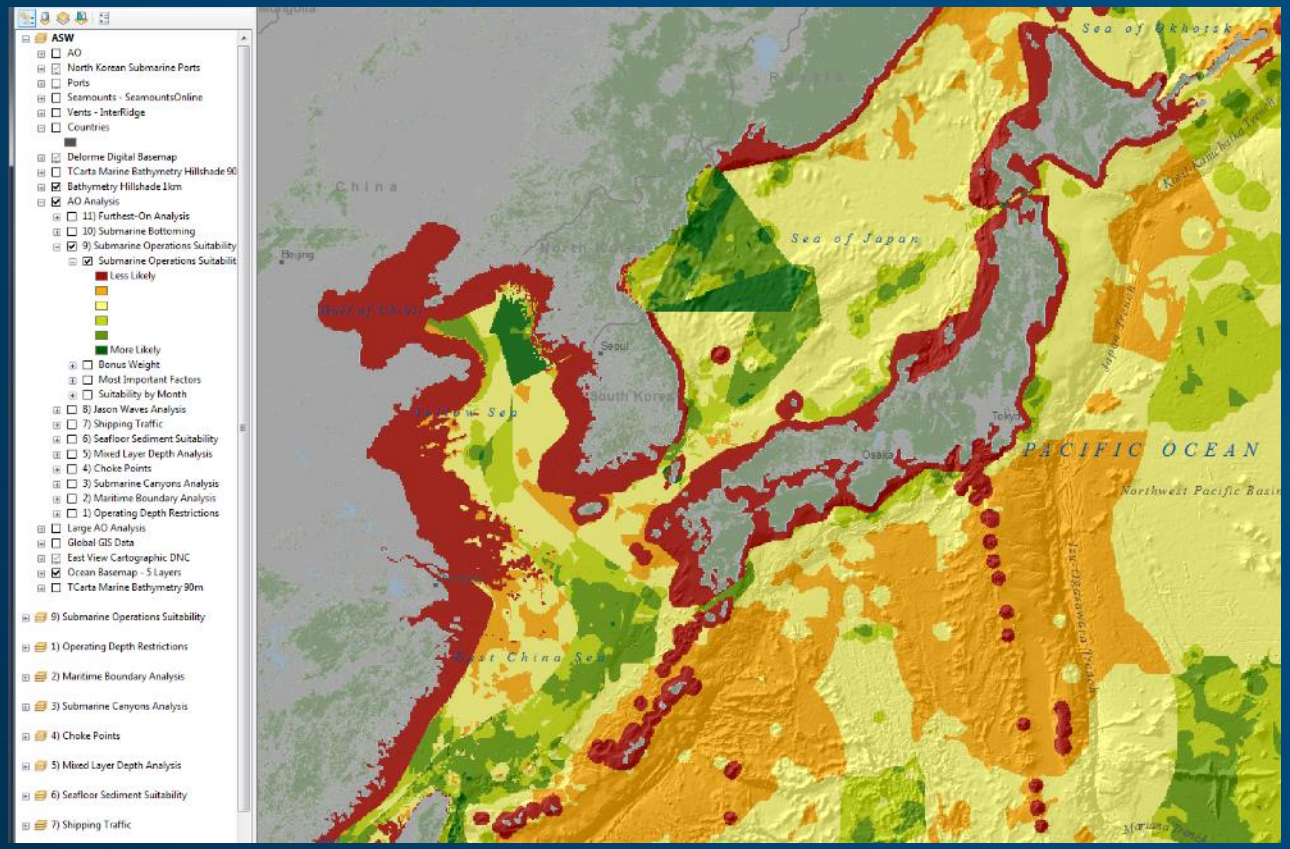
The Language of Spatial Analysis

- Understanding WHERE are my forces and my SIGACTS?
- Measuring What are the main characteristics of my operating environment?
- Determining What are the likely enemy egress routes from a given location?
- Finding How should I place my sensors allowing for optimal coverage?
- Detecting What are the impacts of my operations on the distribution of SIGACTs?
- Making predictions on Where are likely choke points that may impact my ability to maneuver?

The Language of Spatial Analysis

Submarine Operations Suitability

Where are the high probability areas for DPRK submarine operations?



Complex queries and speed models

Predictions based on multiple sets of data

3

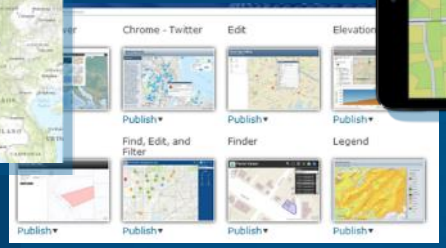
Apps

Reusable, Configurable Apps

Take advantage of COTS

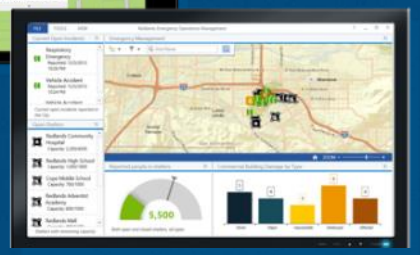
Story Maps

Templates



Explorer

Dashboard

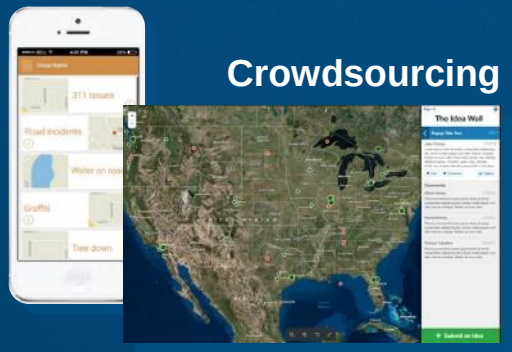


Collector

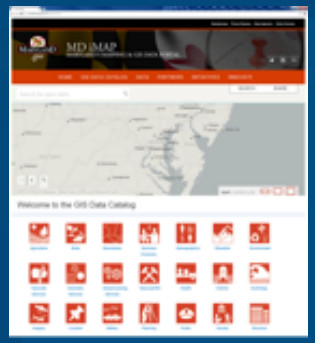
Maps for Office

Web Scene Viewer

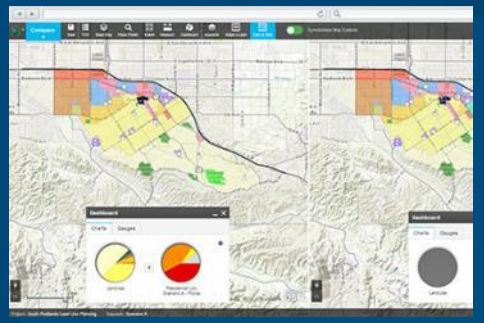
Crowdsourcing



Open Data

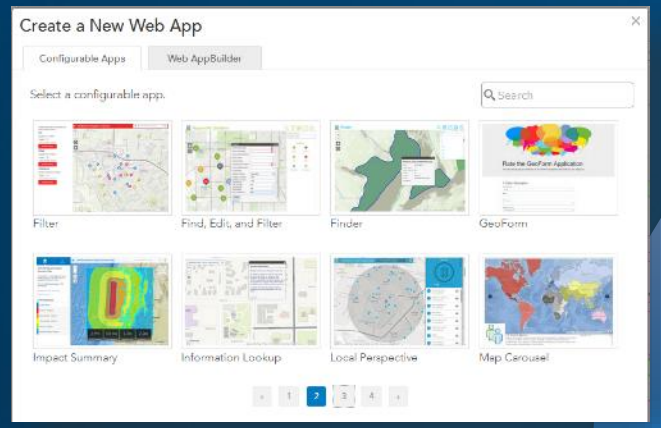


GeoPlanner



App Builders

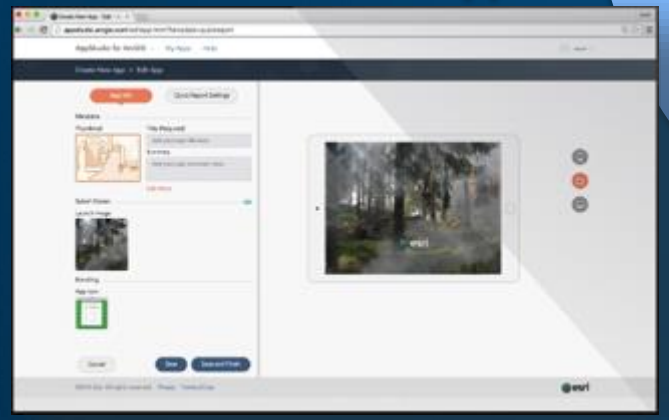
App Templates



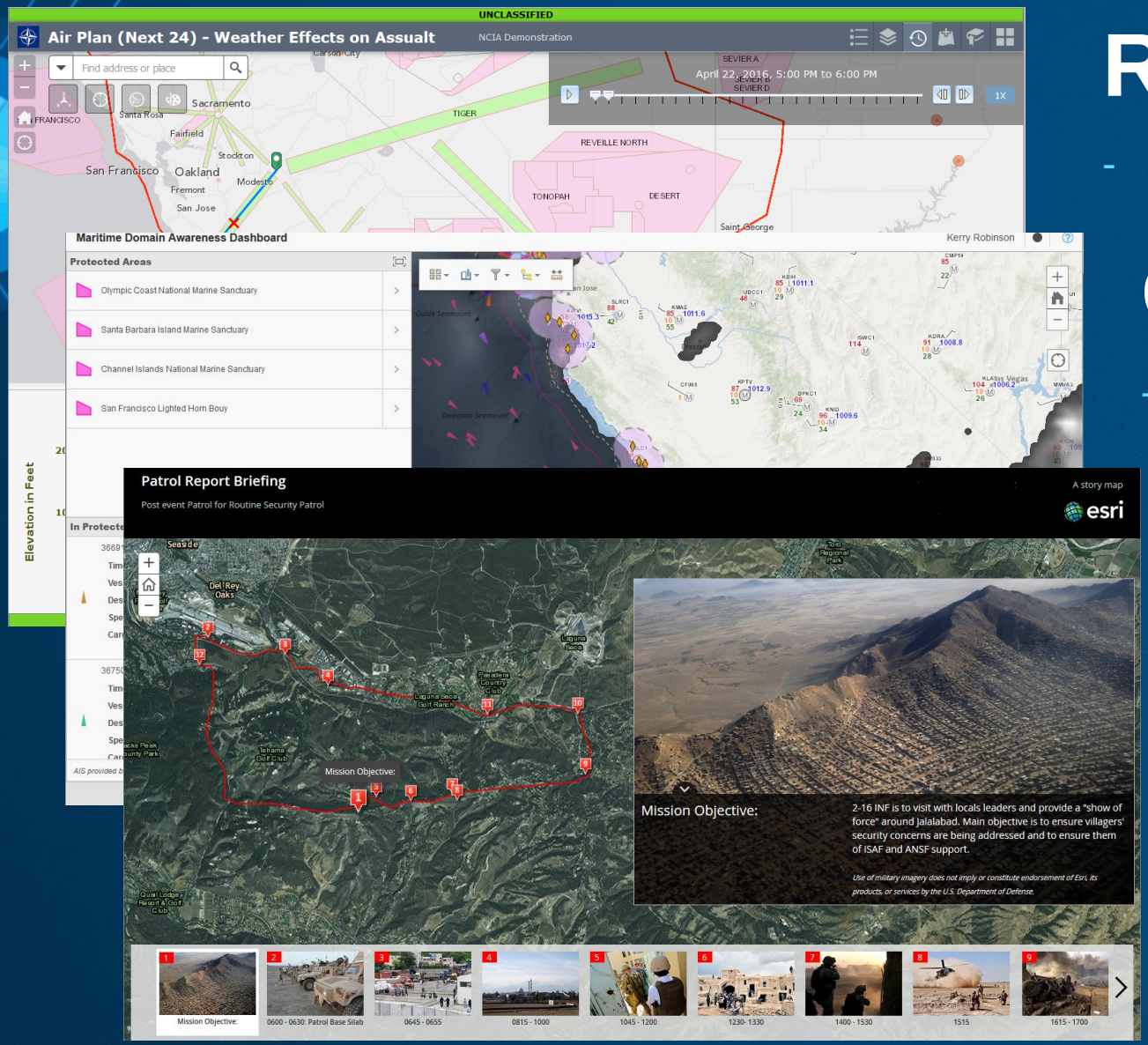
Story Maps

1 2 4 3

AppStudio



Web AppBuilder



Reusable Apps

- Air Plan Web App Template

Operations Dashboard

- Current Air Operations

Briefing

- Patrol After Action Report

4

Best Practices

What is a Template?

Fully documented and open source

- **Maps**
  - Useful examples of standard information products
  - MPK, Web Maps etc..
- **Tools**
  - Standalone Tools or scripts
- **Services**
  - Map, Image, Geoprocessing, Event Processing
- **Application Configurations**

Templates are not new technology!
Instead they are built on what you already have and use.

Take Advantage of Open Source Solution Templates

Ready to use services and applications

Helicopter Landing

CCM

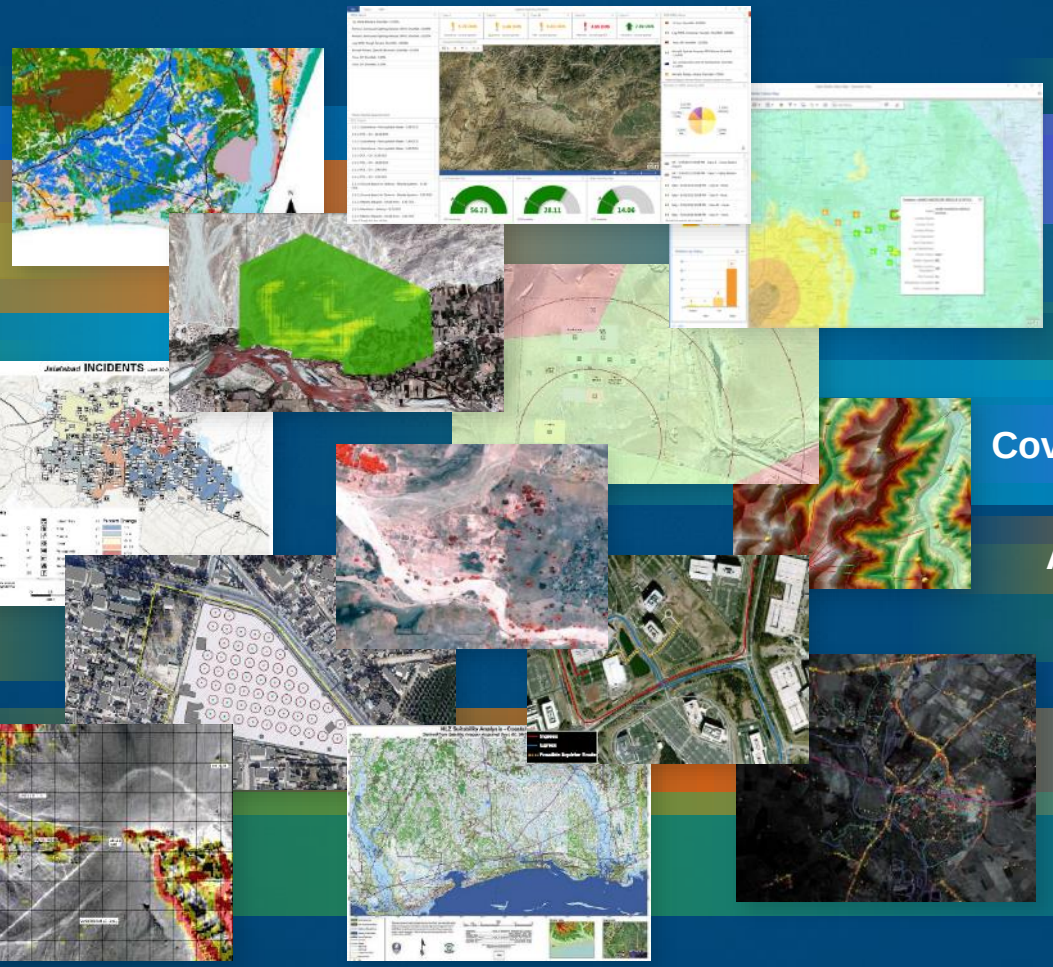
Visibility and Range

Incident Analysis

Compound Mapping

Lines of Communication

Drop Zone



SITEMP

Fields of Fire

Artillery Emplacement

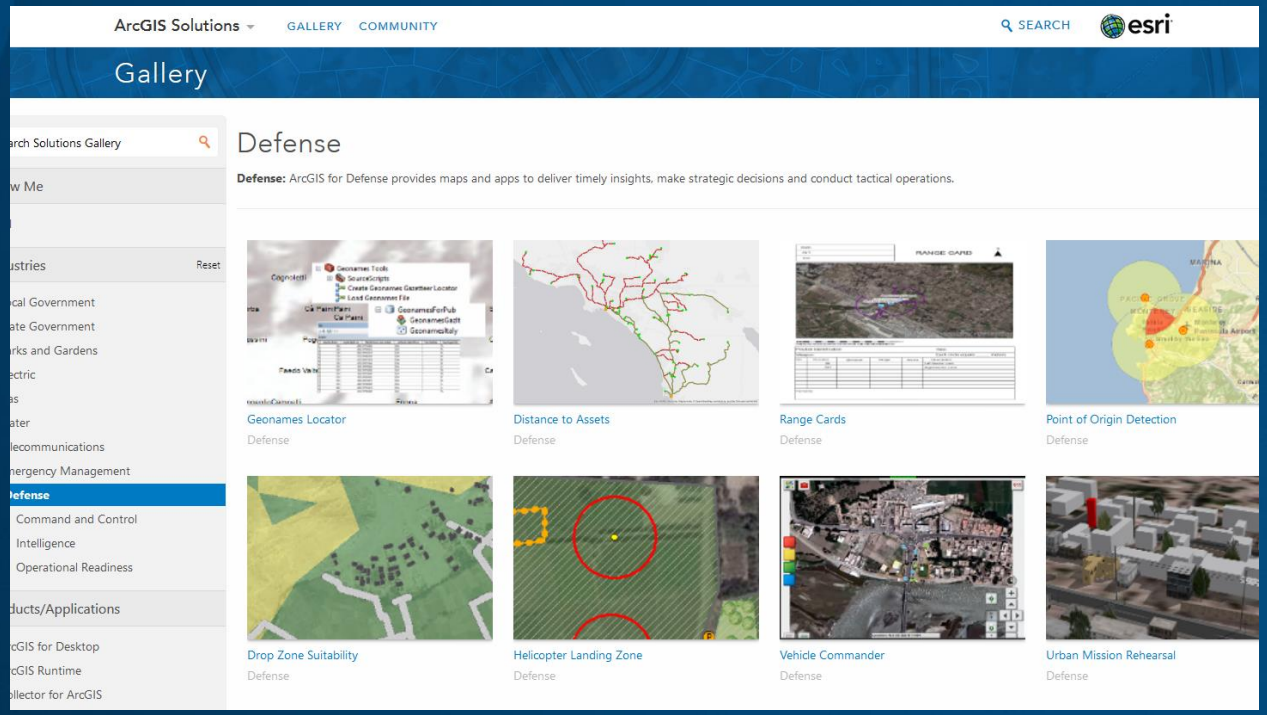
Cover and Concealment

Avenues of Approach

Point of Origin

Key Terrain

Sun Position Analysis



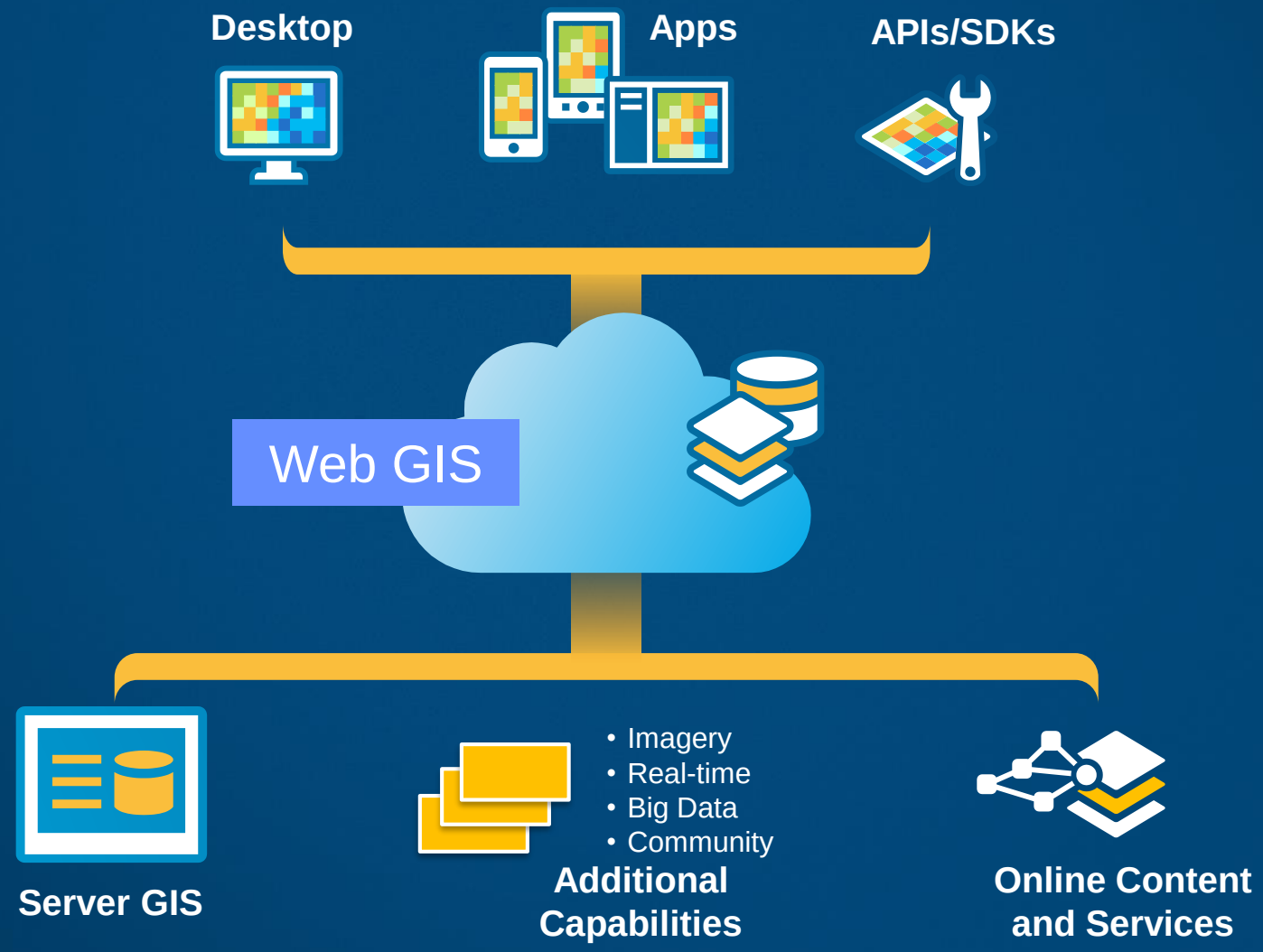
Solutions Templates

- solutions.arcgis.com
- esri.github.io/#Defense

Take Advantage of the GIS Server

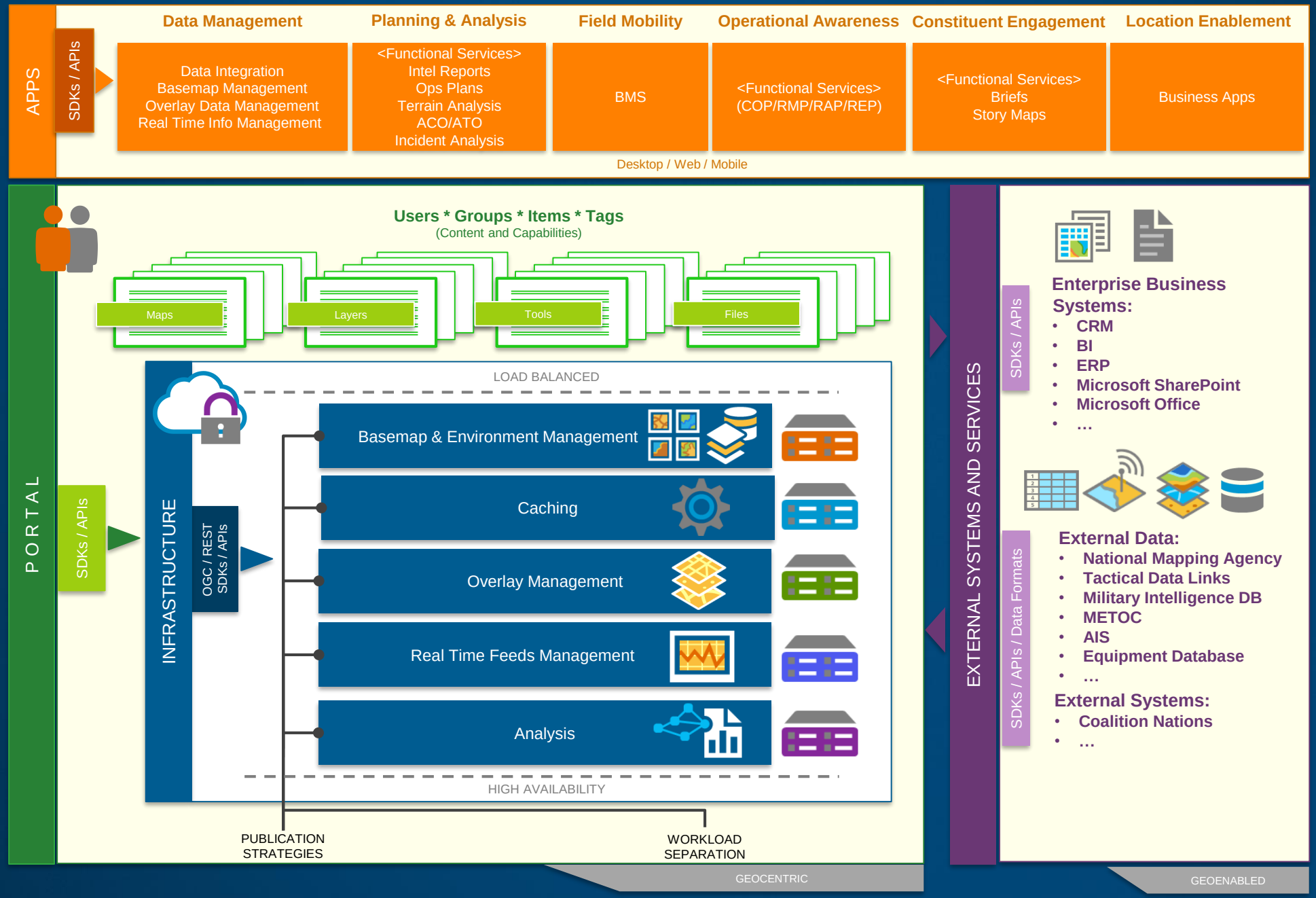
Enabling Web GIS Everywhere

- Simple
- Integrated
- Open



Follow Architectural Best Practices

Sample Conceptual Architecture for Military Operations



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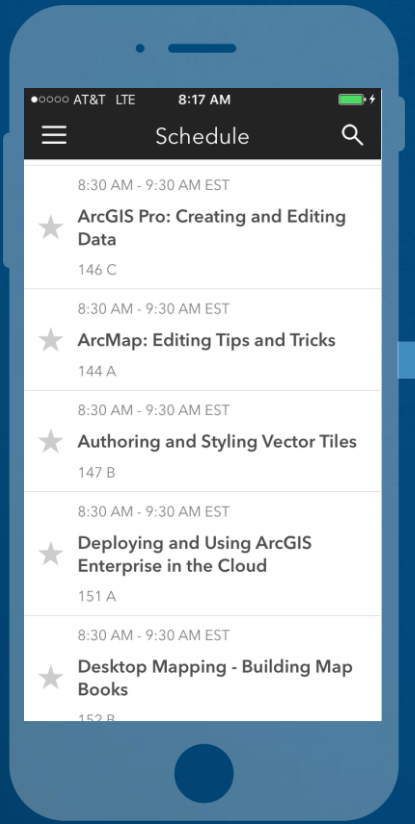
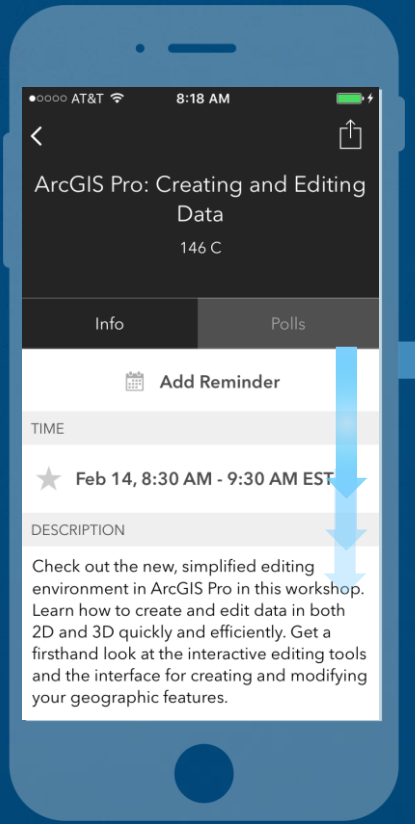
Please Take Our Survey on the **Esri Events App!**

Download the Esri Events app and find your event

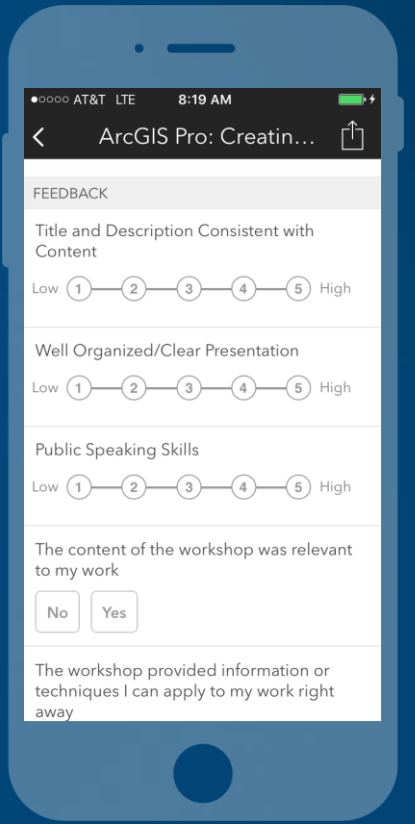
Select the session you attended



Scroll down to find the survey



Complete Answers and Select “Submit”



Print Your Certificate of Attendance

Print stations located in the 140 Concourse

Monday

12:30 PM – 6:30 PM

GIS Solutions Expo,
Hall B

5:15 PM – 6:30 PM

Expo Social,
Hall B

Tuesday

10:45 AM – 5:15 PM

GIS Solutions Expo,
Hall B

6:30 PM – 9:30 PM

Networking Reception,
Smithsonian National Air and Space Museum

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