Esri International User Conference | San Diego, CA

Technical Workshops | July 14 & 15, 2011

Designing an Enterprise GIS Security Strategy

Michael E. Young

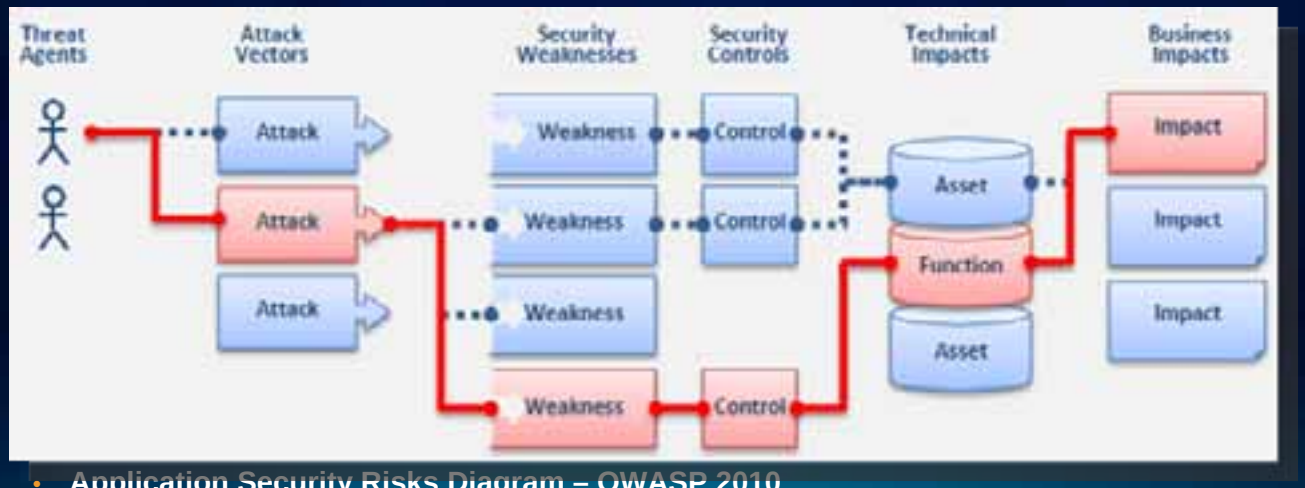
Agenda

- Introduction
- Esri's Security Strategy
- Assessing Your Security Needs
- Security Trends
- Enterprise-wide Mechanisms
- Product Security
- Cloud Computing Security
- Summary

Introduction

Introduction

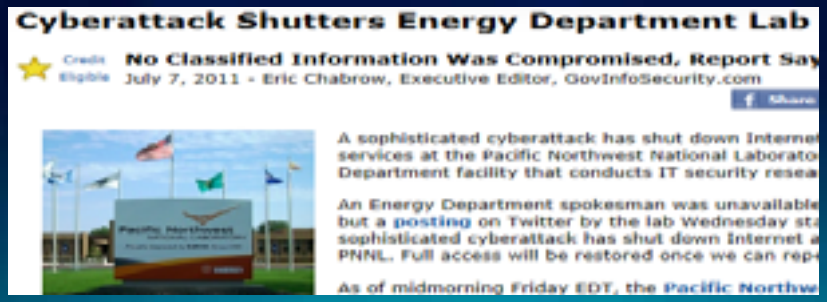
- Michael E Young
  - Esri Senior Enterprise Security Architect
  - Enterprise Implementation Services Team (EIST)
  - FISMA C&A Application Security Officer
  - Certified Information Systems Security Professional (CISSP)



- Application Security Risks Diagram – OWASP 2010

Introduction

- Question
  - Are you happy with your current security?
- 2009 DOE National Lab Security Maxim list
  - True 80-90% of time
  - The “So We’re In Agreement” Maxim
    - If you’re happy with your security, so are the bad guys
- Three DOE National Labs Hacked this year



Introduction

What Does Secure GIS Mean to You?

- Enterprise component integration?
  - Directory Services / LDAP / MS Active Directory
- Standards, Certifications & Regulations?
  - FDCC / FISMA / ISO 2700x / HIPPA
- User Interfaces?
  - ADF, MS Silverlight, Adobe Flex, JavaScript, Rich Clients
- Application vs. security products?
  - ArcGIS Token Service / 3rd Party Single-Sign-On products
- Process, Procedure, Governance?

Don't focus on trying to implement a security silver bullet

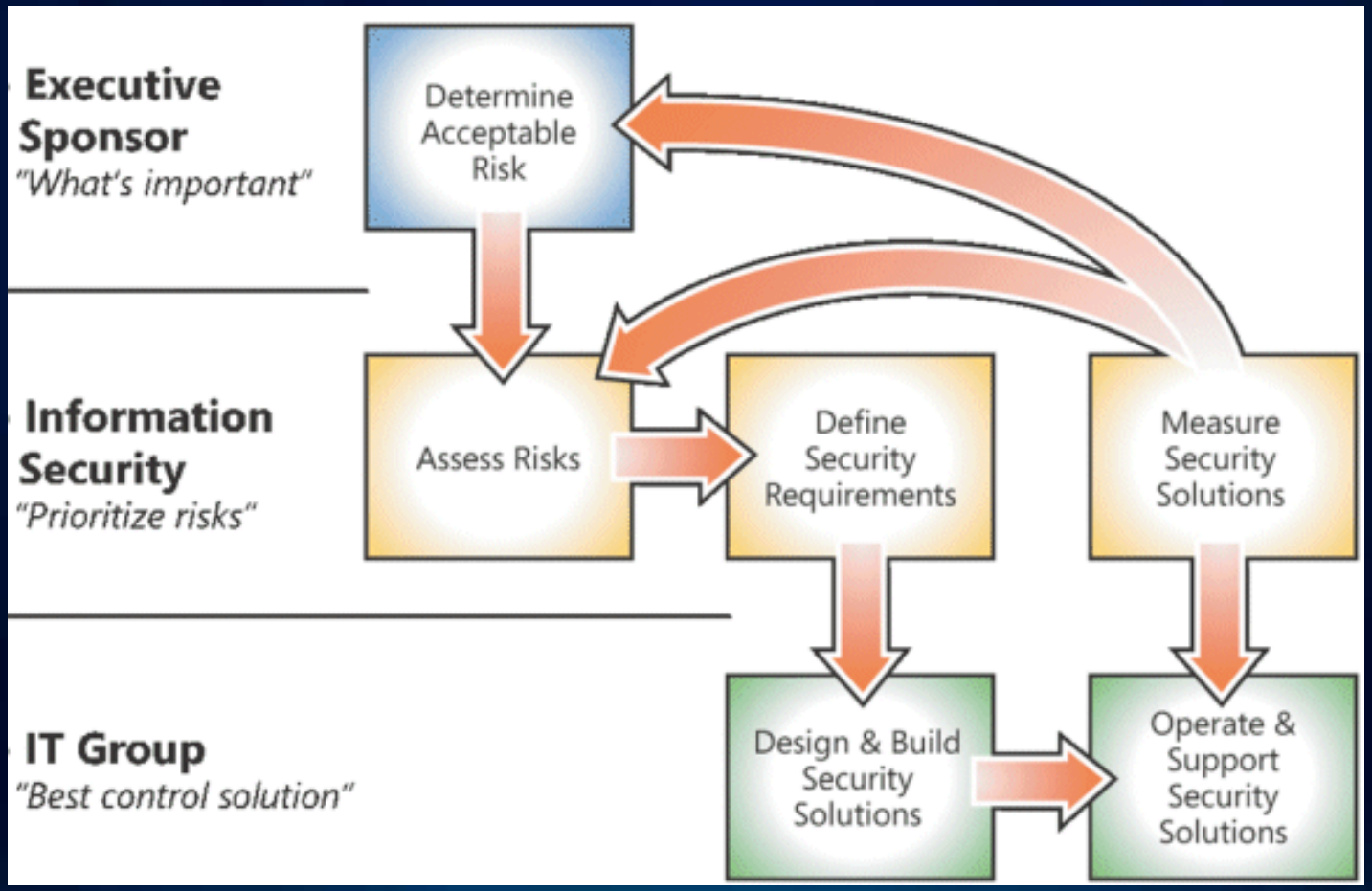
Introduction

Designing an Enterprise GIS Security Strategy

- Identify your Security Needs
  - Assess your environment
  - Datasets, Systems
  - Sensitivity, Categorization, Patterns
- Understand Security Options
  - Enterprise GIS Resource Center
  - Enterprise-wide Security Mechanisms
  - Application Specific Options
- Implement Security as a Business Enabler
  - Improve appropriate availability of information

Introduction

Designing an Enterprise GIS Security Strategy



Security Risk Management Process Diagram - Microsoft

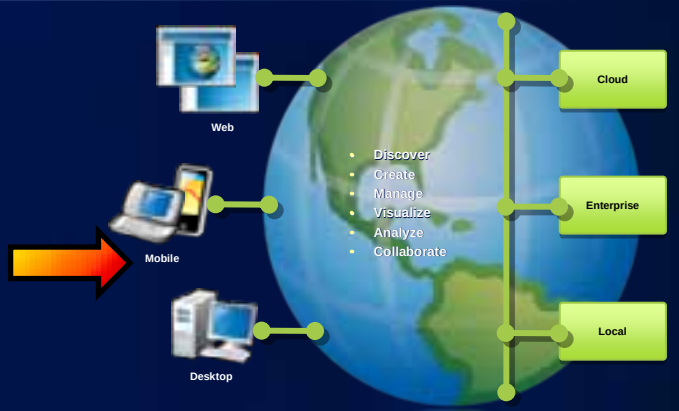
Esri's Security Strategy

Esri's Security Strategy

Reinforcing Trends

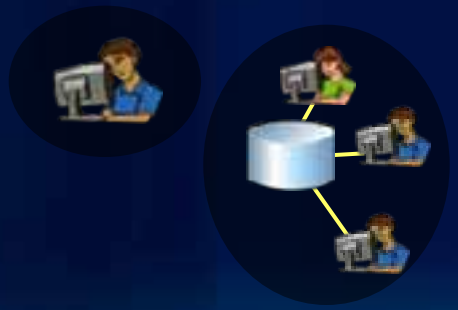
Esri Products

Discrete products and services with 3rd party security

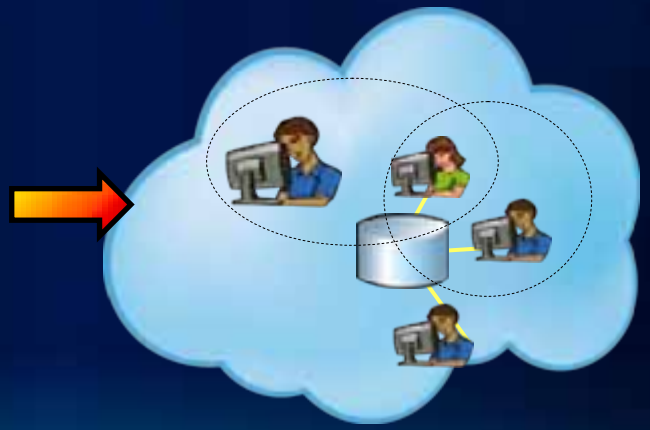


Enterprise platform and services with embedded and 3rd party security

IT Trend



Isolated Systems



Integrated Systems with discretionary access

Esri's Security Strategy

- **Secure GIS Products**
  - Incorporate security industry best practices
  - Trusted geospatial services across the globe
  - Meet needs of individual users and entire organizations

- **Secure GIS Solution Guidance**
  - Enterprise Resource Center
    - http://resources.arcgis.com/
  - Esri security patterns

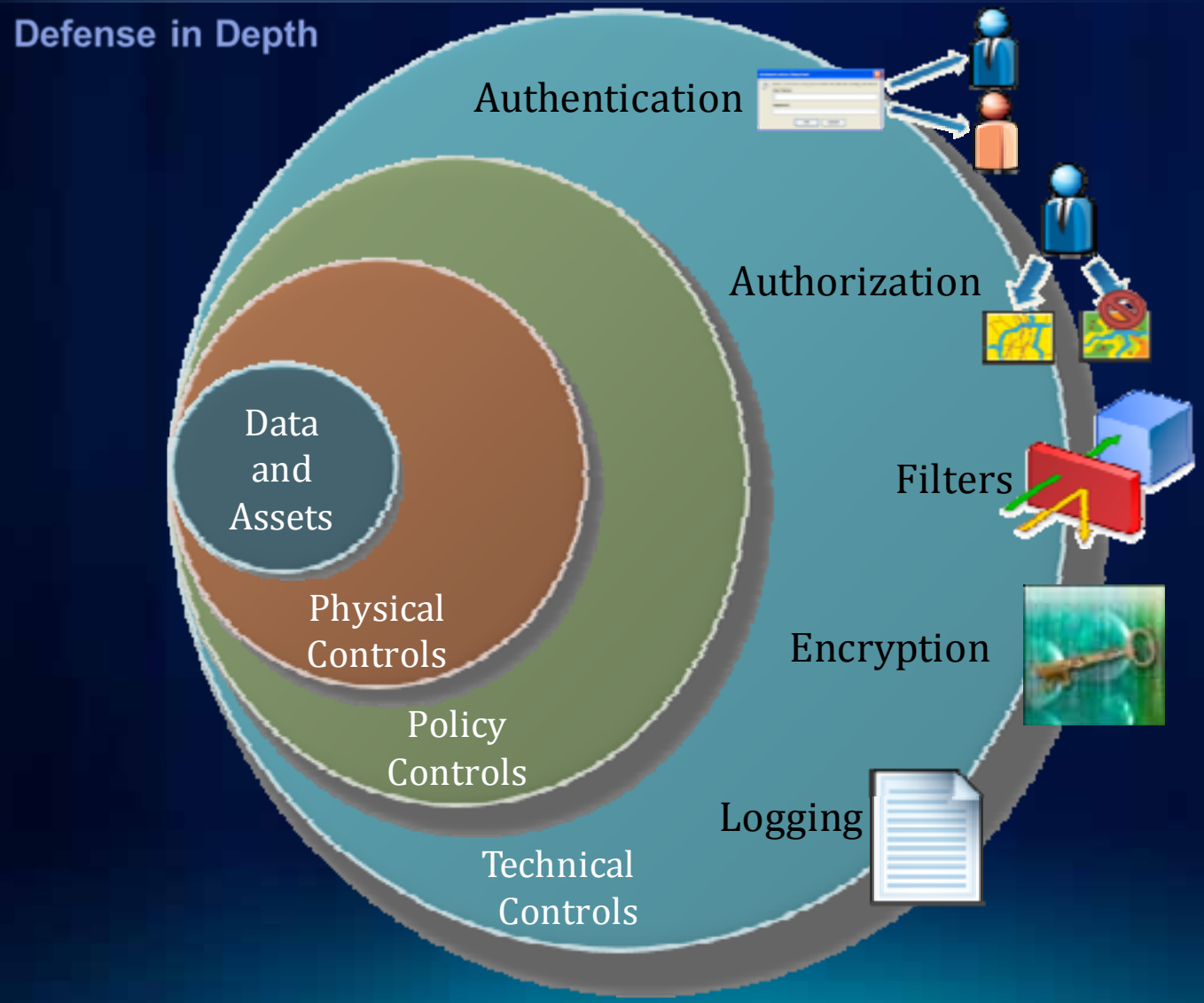
Esri's Security Strategy

Foundational Security Principles

- **CIA Security Triad**
  - **Confidentiality**
  - **Integrity**
  - **Availability**

- **Defense in Depth**
  - **Layers of security across your enterprise**

Esri's Security Strategy



Esri's Security Strategy

Security Patterns

- Esri security implementation patterns
  - Best practice security guidance
- Leverage
  - National Institute of Standards and Technology (NIST)
- Based on risk level
  - First identify *your* risk level

To prioritize information security and privacy initiatives, organizations must assess their business needs and risks

Identifying Your Security Needs

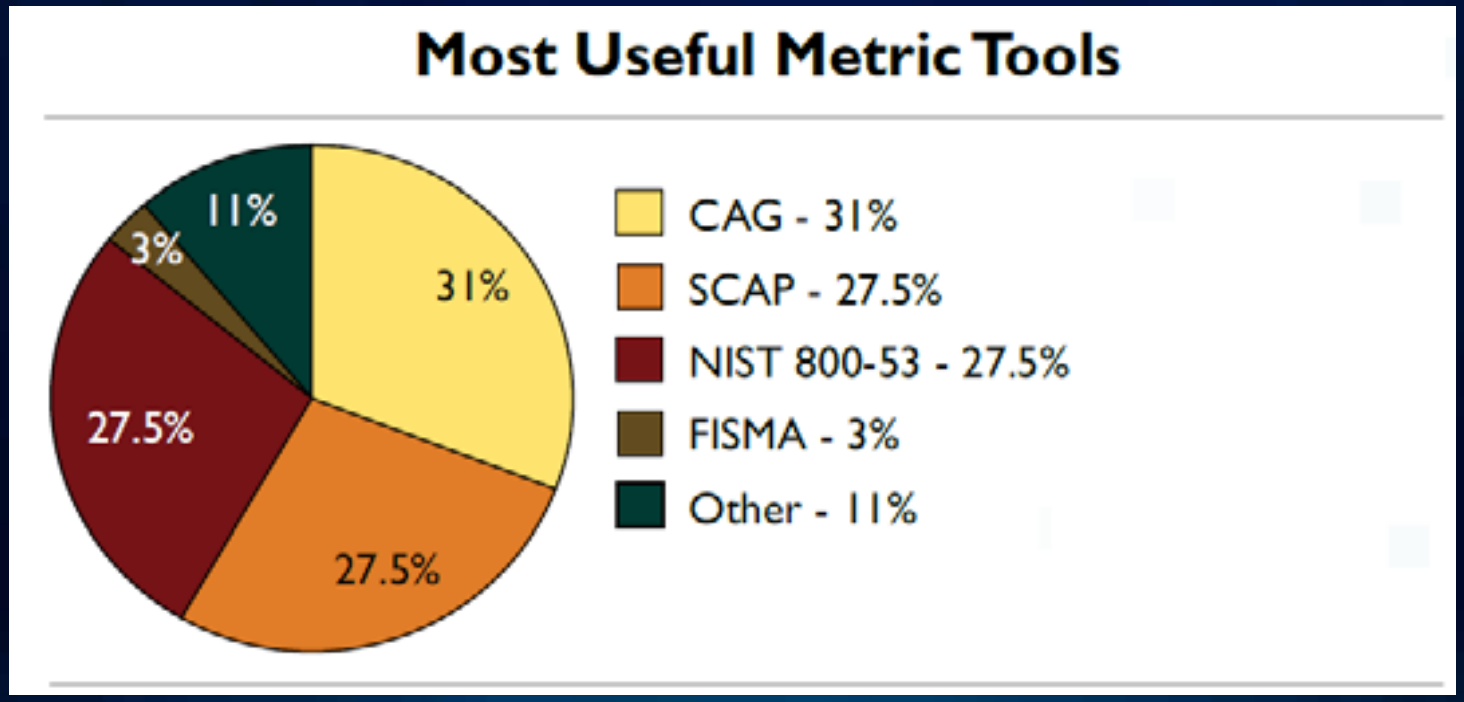
Identifying Your Security Needs

- Assess your environment
- Datasets, Systems, Users
- Sensitivity, Categorization

Identifying Your Security Needs

Assess Your Environment

- **Choose a security standard**
- **Perform an assessment relative to standard metrics**



**The 2010 State of Cybersecurity from the Federal CISO's Perspective*

Identifying Your Security Needs

Identify Sensitive geospatial datasets

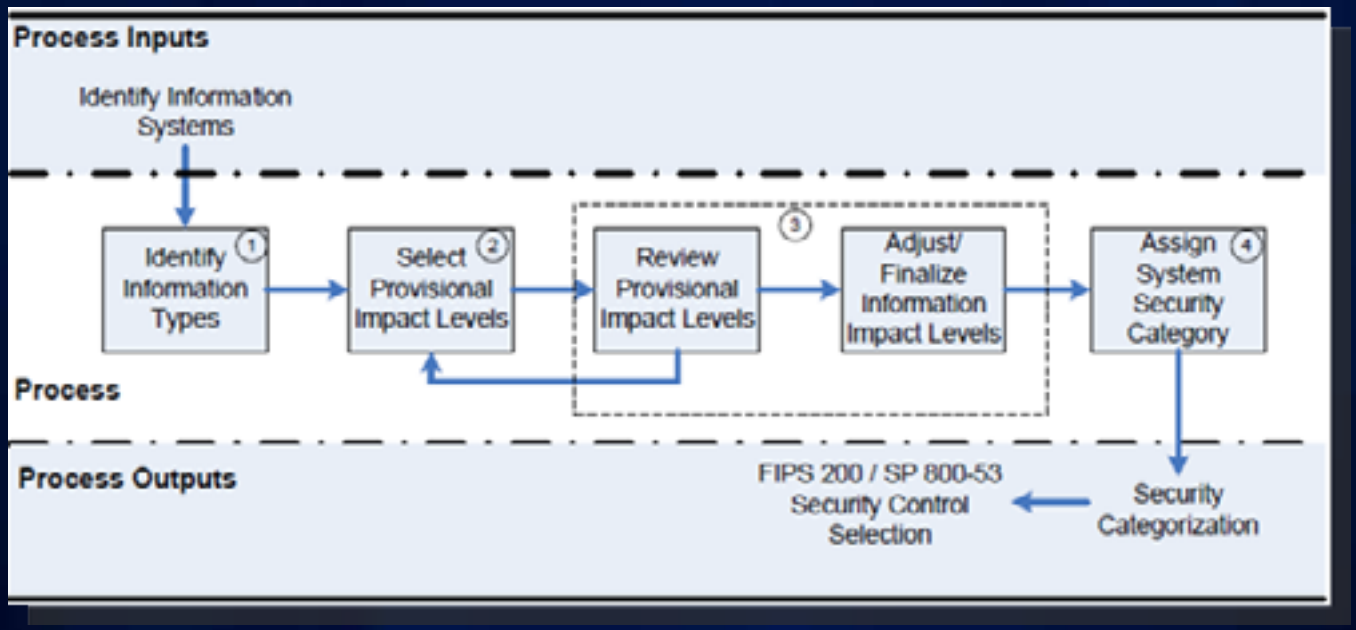
- ***Legislation/Policies/Permits***
  - E.g Privacy Act - Individual identifiable, either directly by georeferenced information or indirect amalgamation
- ***Confidentiality***
  - Data is considered confidential by an organization or its use can be economically detrimental to a commercial interest
- ***Natural Resource Protection***
  - Information can result in the degradation of an environmentally significant site or resource
- ***Cultural Protection***
  - Information can result in the degradation of an culturally significant site or resource
- ***Safety and Security***
  - Information can be used to endanger public health and safety.

**Best Practices for Sharing Sensitive Environmental Geospatial Data*

Identifying Your Security Needs

Categorization, Patterns

- **Formal**
  - **NIST Security Categorization Process**



- **Informal**
  - **Simple scenarios Esri customers can relate to**

Identifying Your Security Needs

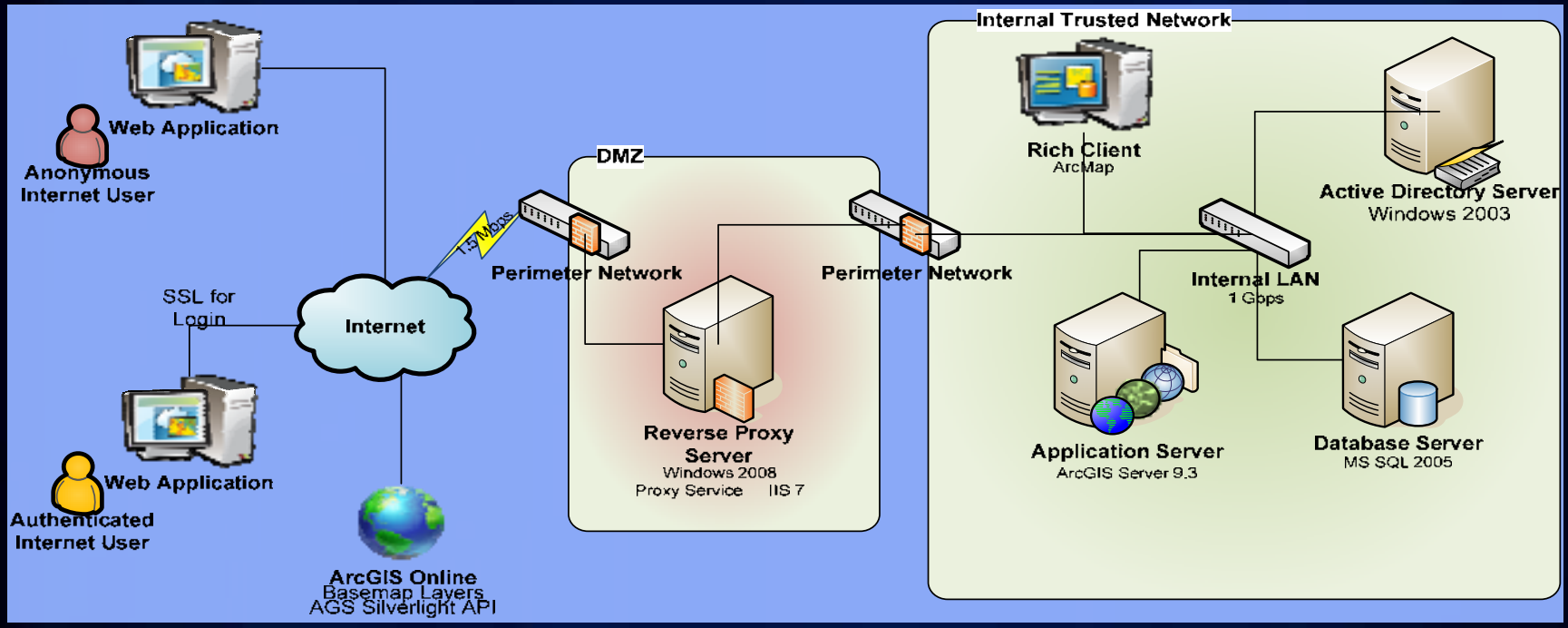
Informal Pattern Selection

- **Basic**
  - No sensitive data – public information
  - All architecture tiers can be deployed to one physical box
- **Standard**
  - Moderate consequences for data loss or integrity
  - Architecture tiers are separated to separate systems
  - Potential need for Federated Services
- **Advanced**
  - Sensitive data
  - All components redundant for availability
  - 3rd party enterprise security components utilized

Basic

Identifying Your Security Needs

Basic Security



- **Common Attributes**
  - Utilize data and API downloads from public clouds
  - Secure services with ArcGIS Token Service
  - Separate internal systems from Internet access with DMZ
  - Reverse Proxy to avoid DCOM across firewalls

Standard

Identifying Your Security Needs

Standard Security Attributes

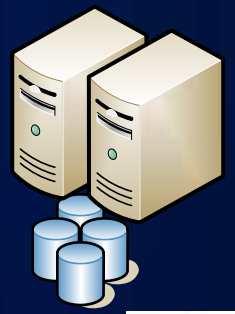
- Web Application Firewall on Reverse Proxy
- Dynamic ArcGIS Tokens
- Separate tiers w/VLANs - Web, Database and Management
- Multi-Factor authentication for External users
- Separate Management traffic connections
- Redundant components
- Local copies of all high-availability data
- Install API's on Local ArcGIS Server for Internal Users
- Intrusion Prevention/Detection Systems
- Lock down ports, protocols, services (Hardening Whitepaper)
- Standardize system images (SMS Whitepaper)
- Host-based firewalls on systems
- Browser plug-in restrictions

Advanced

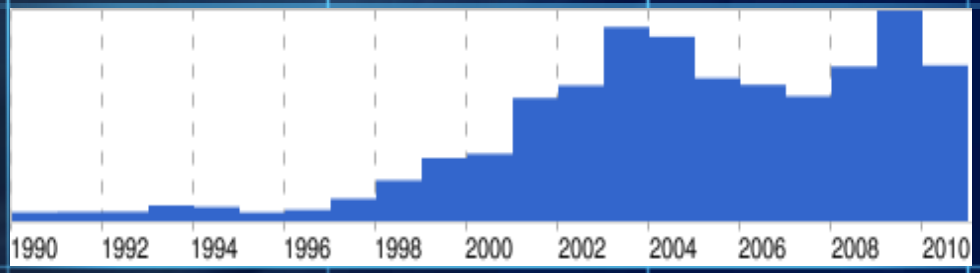
Identifying Your Security Needs

Advanced Security Attributes

- Minimal reliance on external data/systems
- Separate datasets (e.g. Public, Employees, Employee Subset)
- Consider explicit labels
- Clustered Database w/Transparent Data Encryption
- Public Key Infrastructure (PKI) certs
- Local user access via Multi-Factor Authentication
- Remote user access via Hardware Token Multi-Factor
- Network connections redundant w/ IPSec between servers
- SSL/TLS between Clients and Servers (Web and Rich Clients)
- Network Access Control (NAC)



Security Trends



Cyber Security Articles Over Time

Security Trends

Breaches


Hackers target top contractor, nab passwords

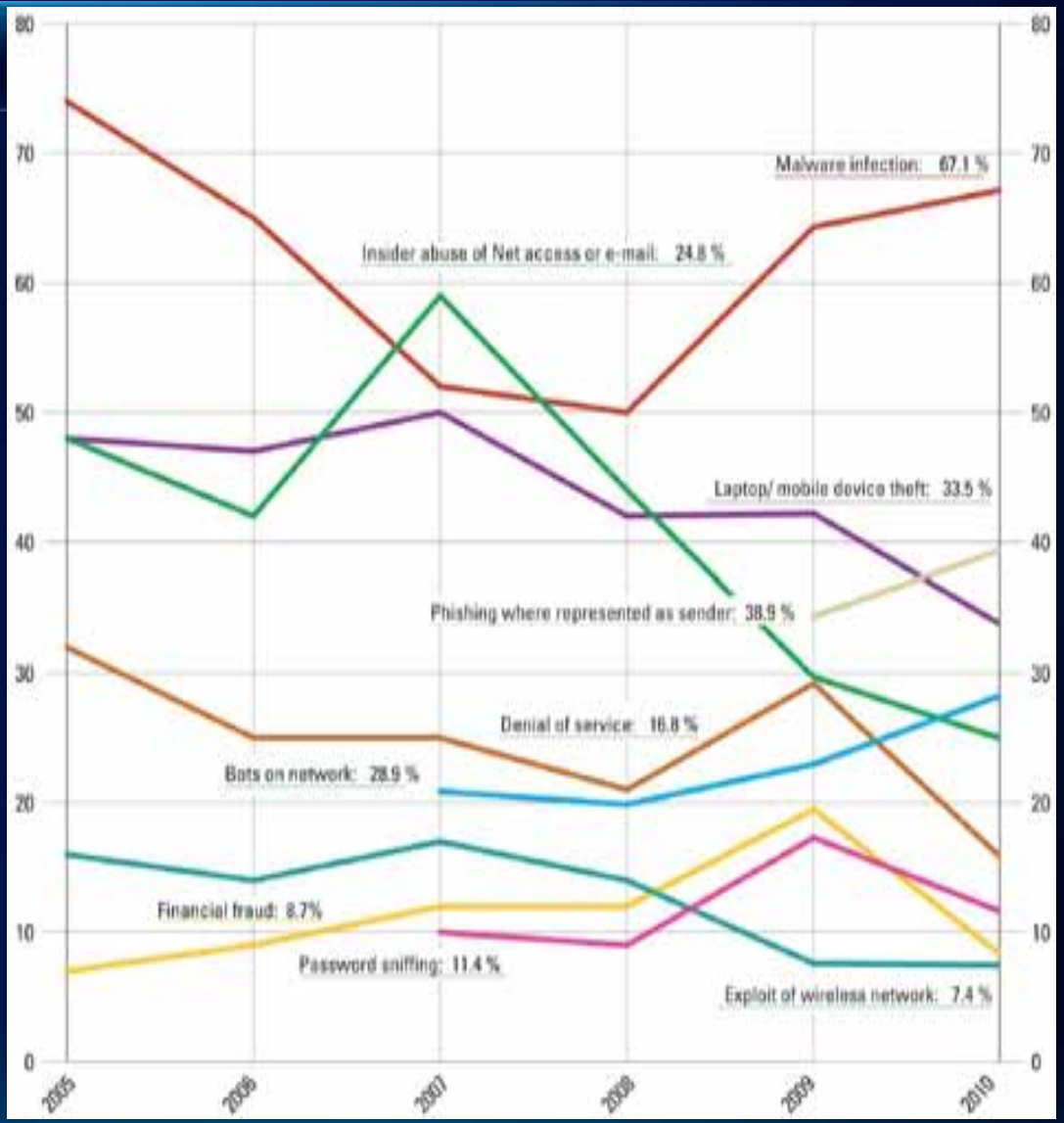
By Jonathan Stray and Raphael G. Satter - The Associated Press
Posted : Monday Jul 11, 2011 19:21:28 EDT

- 2011
  - Citigroup – 360,000 Credit card accounts
  - Sony – 100+ Million accounts – Recovery over $200 mill
  - RSA – The security company hacked
  - Lockheed – Compromise via discoveries from RSA hack
  - DOE – 3 National Labs This Year (Spearfishing)
  - FBI, CIA, PBS, Electronic Arts… and more…
- Security Expert Conclusion (SANS 7/6/2011)
  - Cost of successful attack against targets of choice has fallen dangerously low
- Why?
  - Financial Harm/Gain
  - Company Retribution

Security Trends

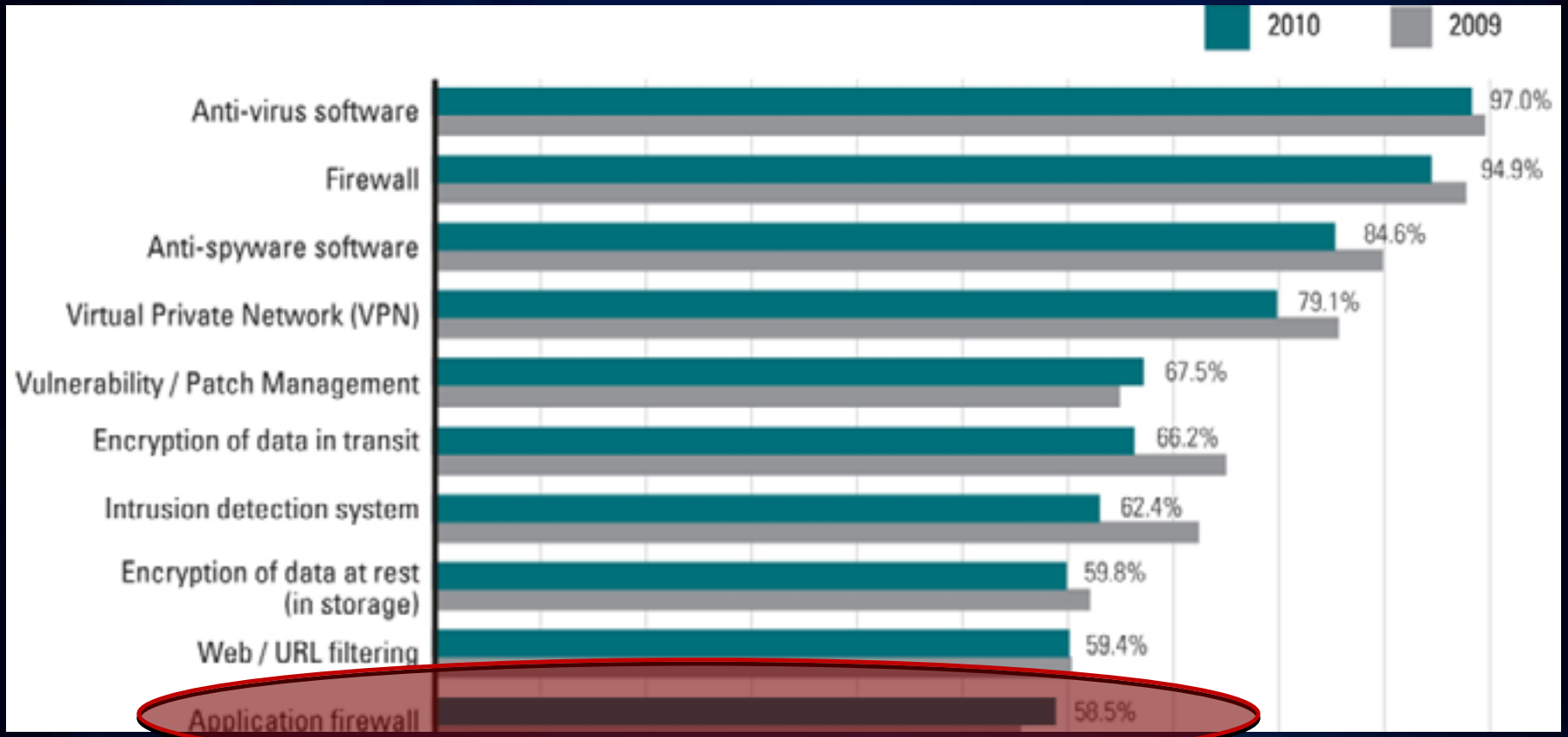
Types of Attacks

- 2010 CSI Survey
  - Continuing increase
    - Phishing
    - Malware infection
  - Key solutions
    - Log Management
    - Dashboards



Security Trends

Security Technologies Utilized



Security Trends

Cybersecurity Evolving

- Compliance
  - Shift from compliance-based to continuous monitoring / prioritization
  - 20 Critical Security Controls excellent example
- Location / Privacy concerns
  - More applications utilizing current user location to deliver content
  - Proposed Bills Address Geo-Location Data Privacy (6/15/11)
    - Inform users about what type of information is being collected
    - Obtain permission from consumers before sharing geo-location data
- Geolocation Aggregation
  - Creepy - Pinpoints location of targeted individuals via geotagged pictures and social networking services

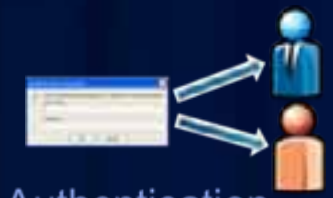
Security Trends

What is the response?

- Cybersecurity becoming a business process
- IT/Security teams must now know
  - Where data resides
  - Where it moves
  - How to protect it
- Requires comprehensive data security practice
  - Security teams will become business process experts to keep the bad guys disarmed while keeping the good guys productive

Enterprise-wide Security Mechanisms

Enterprise-Wide Security Mechanisms



Authentication

Authorization

Filters

Encryption

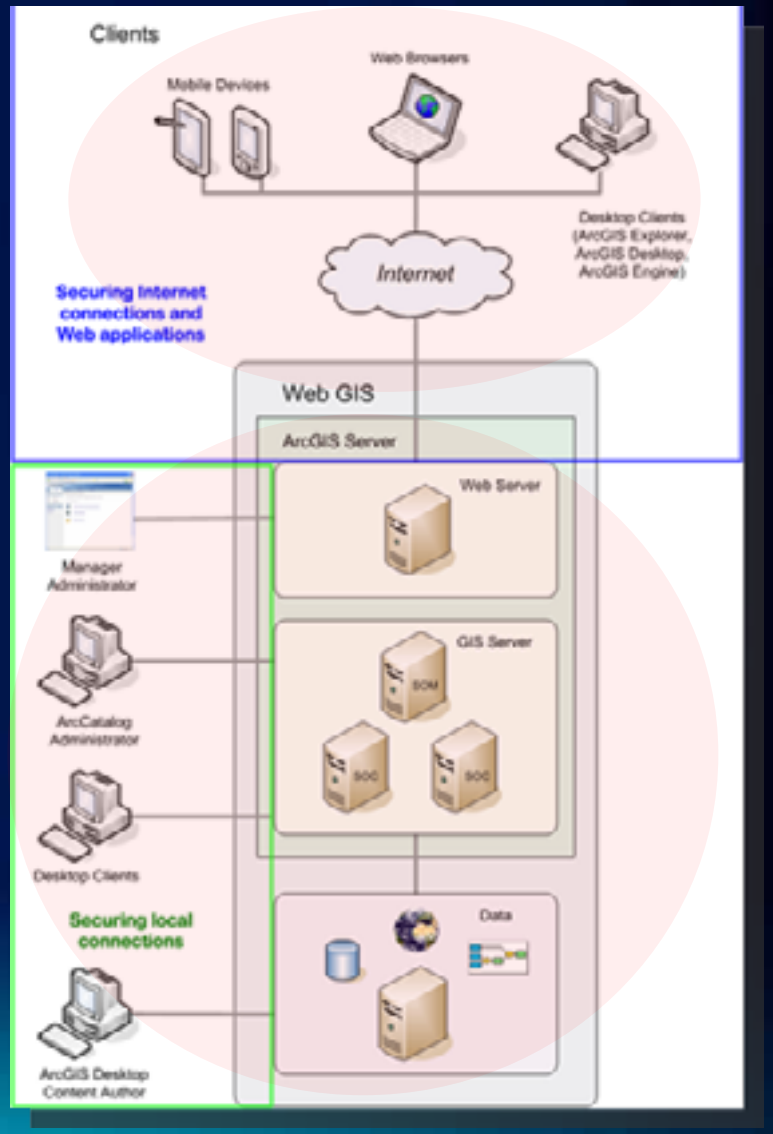
Logging/Auditing

Enterprise-Wide Security Mechanisms

Authentication – 3 ArcGIS Server Schemes

- **Web Traffic via HTTP**
  1. **Web Services**
  2. **Web Applications**

- **Intranet Traffic via DCOM**
  3. **Local Connections**



Enterprise-Wide Security Mechanisms

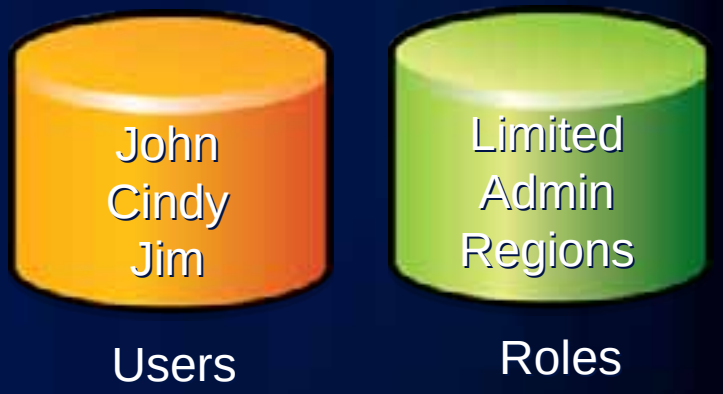
Authentication

Access Restricted	Authentication Method	Protocol	Description	Encryption
Web Service or Web Application	None	HTTP	Default Internet Connections	N/A
	Basic Digest Windows Integrated	HTTP (SSL optional)	Browser built-in pop-up login dialog box.	Basic None, unless using SSL
	Java EE Container	HTTP (SSL optional)	Web container provides challenge for credentials	Container Managed
	Client Certificates PKI Smart Cards	HTTPS	Server authenticates client using a public key certificate	PKI Managed
Web Application Only	.NET Form-based	HTTP (SSL optional)	Application provides its own custom login and error pages.	None, unless using SSL
	Java ArcGIS Managed	HTTP (SSL optional)	ArcGIS Server provides login page for Java Web App	None, unless using SSL
Web Service Only	Esri Token	HTTP (SSL optional)	Cross Platform, Cross API Authentication	AES-128bit
Local	Windows Integrated	DCOM	Default Local Connections OS Groups AGSUser AGSAdmin	OS Managed

Enterprise-Wide Security Mechanisms

Authentication – User and Role Storage Options

- **Java Options**
  - ***Default* – Apache Derby**
  - **External Database**
  - **LDAP**
  - **MS Active Directory**
- **.NET Options**
  - ***Default* - Windows Users and Groups**
  - **MS SQL Server**
  - **Custom Provider**
    - **Instructions for Active Directory and Oracle Providers available**

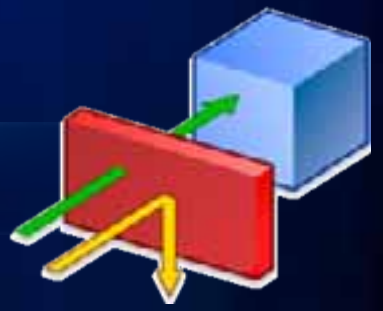


Enterprise-Wide Security Mechanisms

Authorization – Role Based Access Control

- Esri COTS
  - Assign access with ArcGIS Manager
  - Service Level Authorization across web interfaces
  - Services grouped in folders utilizing inheritance
- 3rd Party
  - RDBMS – Row Level or Feature Class Level
    - Versioning with Row Level degrades RDBM performance
    - Alternative - SDE Views
- Custom - Limit GUI
  - Rich Clients via ArcObjects
  - Web Applications
    - Sample code Links in ERC
    - Microsoft's AzMan tool

Enterprise-Wide Security Mechanisms



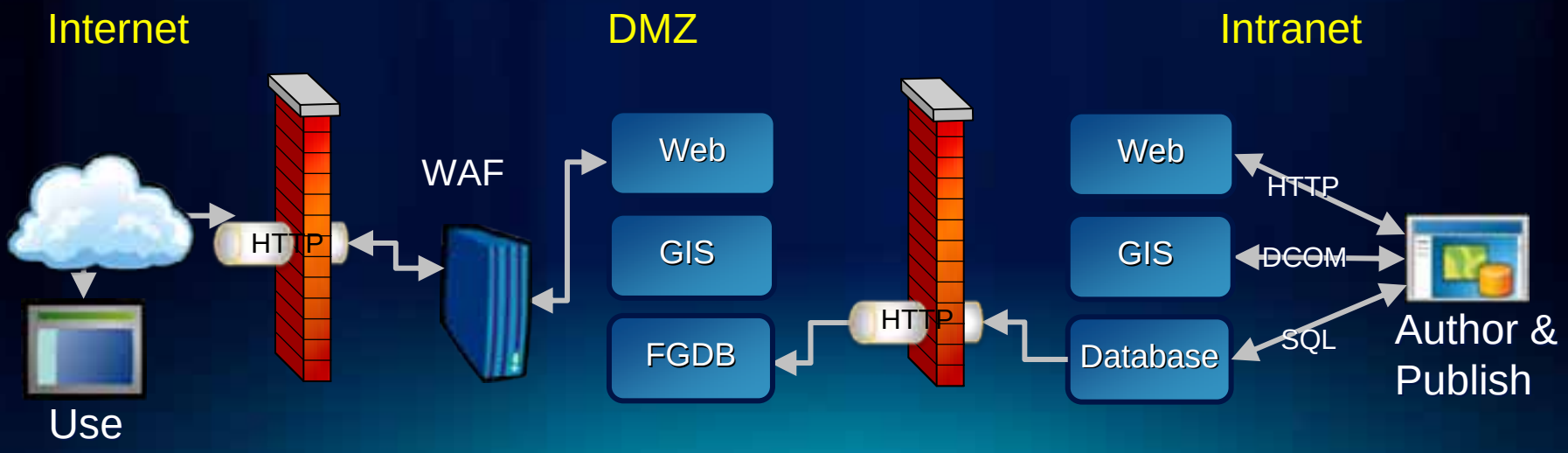
Filters – 3rd Party

- Firewalls
- Reverse Proxy
  - MS free reverse proxy for IIS 7 (Windows 2008)
- Web Application Firewall
  - Open Source option ModSecurity
- Anti-Virus Software
- Intrusion Detection / Prevention Systems
- Limit applications able to access geodatabase

Enterprise-Wide Security Mechanisms

Filters – Firewall Friendly Scenario

- **Web Application Firewall (WAF) in DMZ**
- **File Geodatabase (FGDB) in DMZ**
  - **One-way replication via HTTP(s)**
  - **Deployed to each web server for performance**
  - **Internet users access to subset of Geodatabase**



Enterprise-Wide Security Mechanisms

Filters

- Why no Reverse Proxy in DMZ?
  - One-off component / no management, minimal filtering
- Multi-Function Web Service Gateways
  - Store SSL Certificates / SSL Acceleration
  - URL Rewrite
  - Web Application Firewall

Enterprise-Wide Security Mechanisms

Encryption – 3rd Party Options

- Network
  - IPSec (VPN, Internal Systems)
  - SSL (Internal and External System)
- File Based
  - Operating System – BitLocker
  - GeoSpatially enabled PDF's combined with Certificates
  - Hardware (Disk)
- RDBMS
  - Transparent Data Encryption
  - Low Cost Portable Solution - SQL Express 2008 w/TDE

Enterprise-Wide Security Mechanisms

Logging/Auditing

- **Esri COTS**
  - **Geodatabase history**
    - **May be utilized for tracking changes**
  - **ArcGIS Workflow Manager**
    - **Track Feature based activities**
  - **ArcGIS Server 10 Logging**
    - **"User" tag allows tracking of user requests**

```
<Msg time='2009-10-31T14:36:05'
        type='INFO3'
        code='4004'
        target='Yellowstone.MapServer'
        machine='padisha'
user='Fred'
        thread='2936'
        elapsed='2.443'>
        Server Object instance is succes
</MSG>
```

- **3rd Party**
  - **Web Server, RDBMS, OS, Firewall**
  - **Consolidate with a SIEM**

86 % of victims had evidence of the breach in their logs, yet 61 % of the breaches were discovered by a third party

*Verizon's 2010 Data Breach Investigations Report

Product Security Options

Rich Clients

Mobile

ArcGIS Server

Cloud Services

Rich Client Security

Rich Client Security

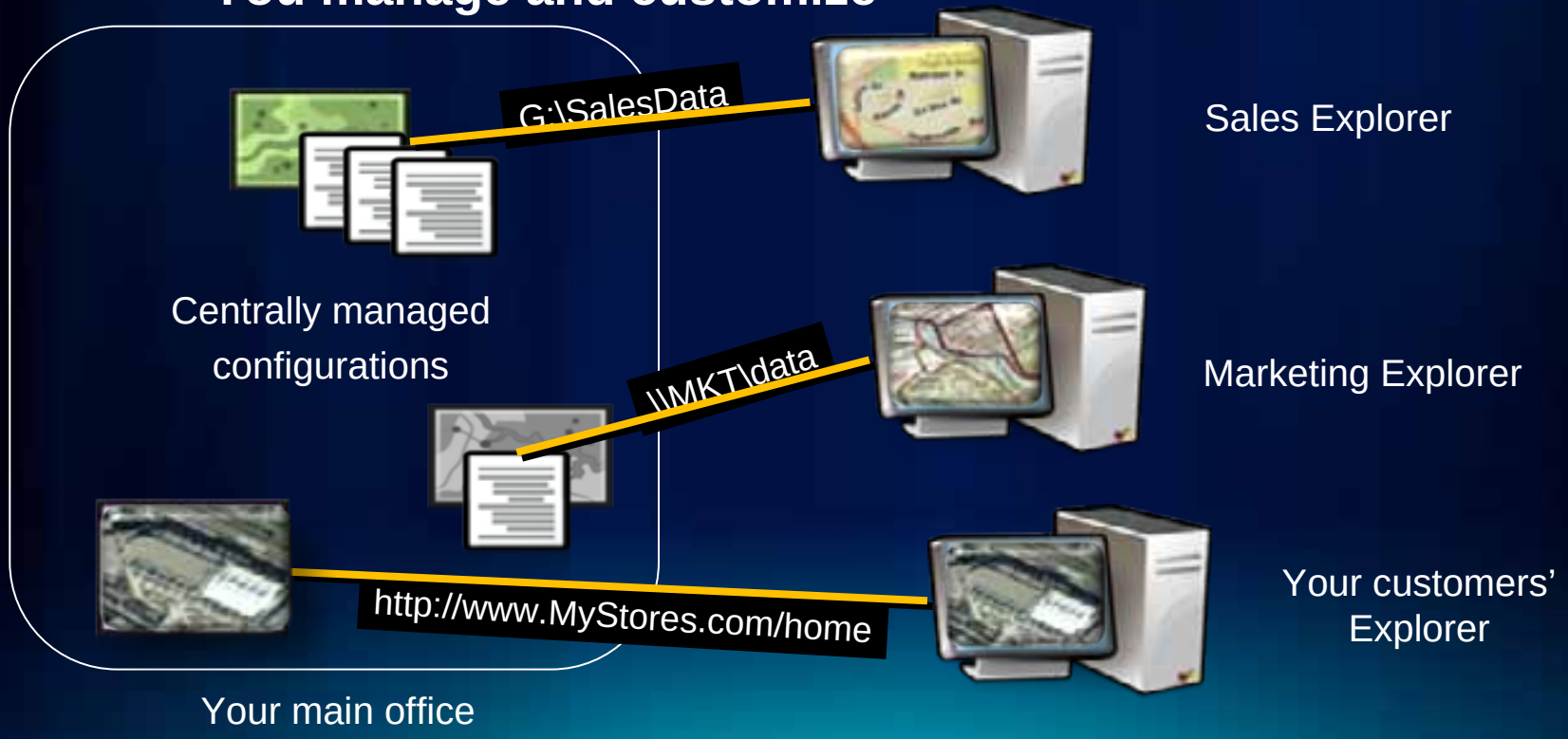
Desktop

- Client typically with most access to sensitive data
- Variety of system connections
  - Direct Connect – RDBMS
  - Application Connect – SDE
  - HTTP Service – GeoData Service
    - Integration with Token Service
    - Windows native authentication
  - SSL and IPSec Utilization
- ArcObject Development Options
  - Record user-initiated GIS transactions
  - Fine-grained access control
    - Edit, Copy, Cut, Paste and Print

Rich Client Security

ArcGIS Explorer Communication

- **Explorers for different users or topics**
- **Focused data and functions in one place**
- **You manage and customize**



Mobile Phone Security

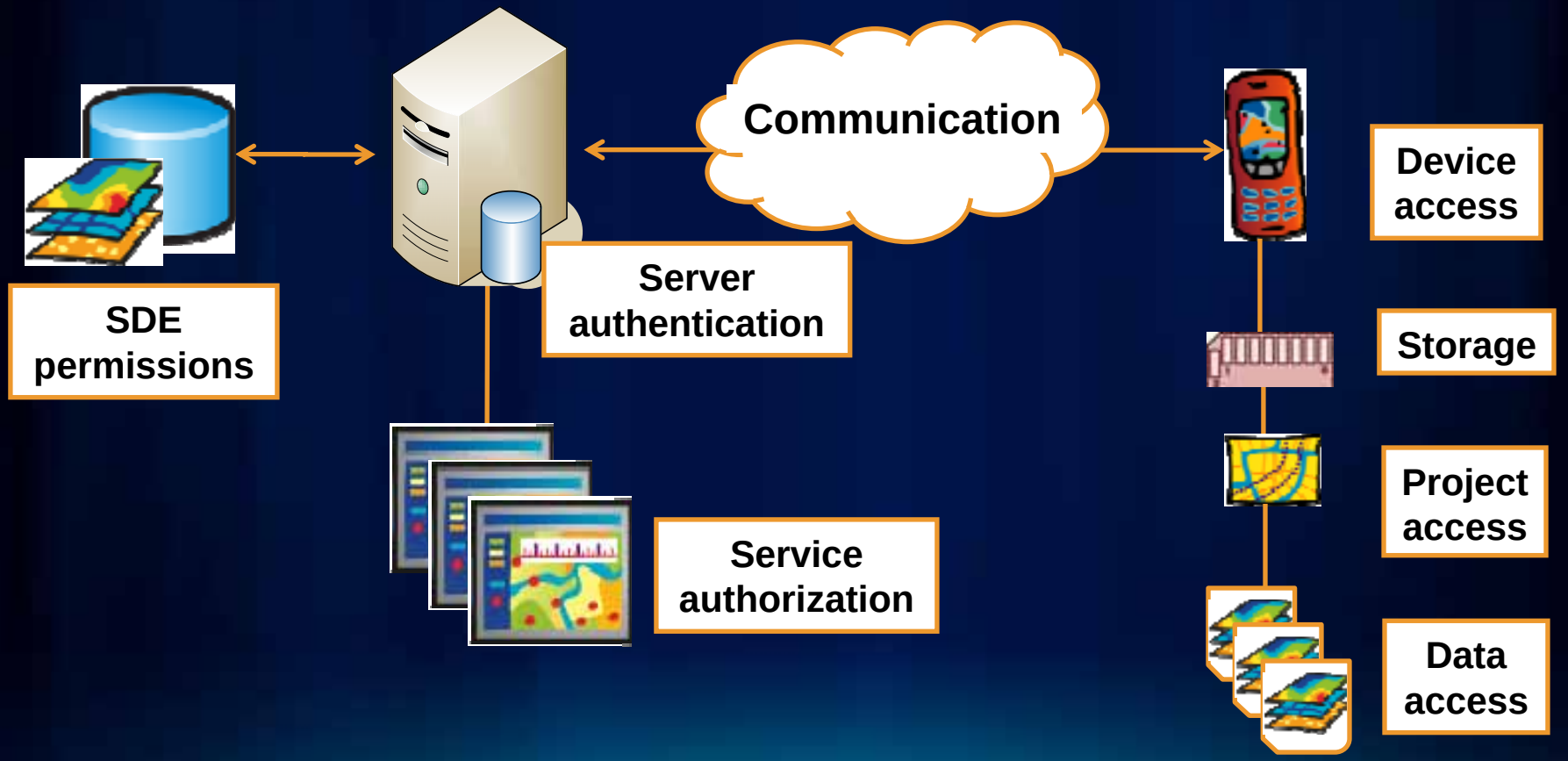
Mobile Phone Security

- More
  - Platforms
    - ArcPad
    - ArcGIS Mobile
    - iPhone
    - Android
    - Windows 7
  - Functionality/Storage
  - User-base

- Leads to
  - Increased Hacker Attention

Mobile Phone Security

ArcGIS Mobile Security Touch Points



Mobile Phone Security

ArcGIS Mobile

- Encrypt Communication
  - HTTPS (SSL) or VPN tunnel
- Web Service Authentication / Authorization
  - Windows Authentication or Token Service
  - Filter by OS / IP / Unique Device Identifier
- Encrypt data at Rest
  - Windows Mobile Crypto API
  - 3rd Party tools for entire storage system
- Mobile Device Management
  - Good Technology…

ArcGIS Server Security

ArcGIS Server Security

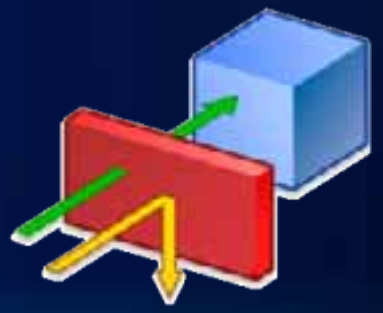
Common Questions/Issues

- **Is Communication Across Wire Secure by Default?**
  - **No**
    - **Communication via ArcGIS Server and all clients is clear-text by default**
    - **Secure web communication with an SSL Certificate**
    - **Secure internal DCOM communication with IPSec**

ArcGIS Server Security

Common Questions/Issues

- **Is a reverse proxy required?**
  - **No**
    - **Some customers implement to eliminate DCOM traffic across firewalls**
    - **Used with Web Application Firewall improves security posture**



ArcGIS Server Security

Common Questions/Issues

- **Is there Security Hardening Guidance?**
  - **Yes**
    - **Check out the ERC Implementation Gallery**
    - **Next update expected in 2011 - Version 10 Win 2k8**

ArcGIS Server Security

Common Questions/Issues

- **Should I assign the Everyone group to the root in ArcGIS Manager?**
  - **Depends**
    - **Everyone will have access to your services by default**
    - **OK for Basic security risk environments**
    - **NOT recommended for any Standard or Advanced security**
    - **Deny by default used in higher risk environments**

ArcGIS Server Security

Common Questions/Issues

- **Can I provide security more granular then service level?**
  - **Yes**
    - **SDE Views or 3rd Party Software**
    - **Integrated security model**

ArcGIS Server Security

Flowing web user identity down to the database

- Integrated Security Model (ISM)
- Flow web user identity to database via proxy user
  - Logging - Non-repudiation across all architecture tiers for high risk security environments
  - Row-Level Security - Database driven security model for high-risk security environments
- Current Status
  - Customer scenarios collected
  - Simple layer level security performance validation completed
    - 10-20% performance overhead
  - More complex scenarios to be validated next
  - Basic documentation online for Java ArcGIS Server

ArcGIS Server Security

ISM Initial Validation Configuration

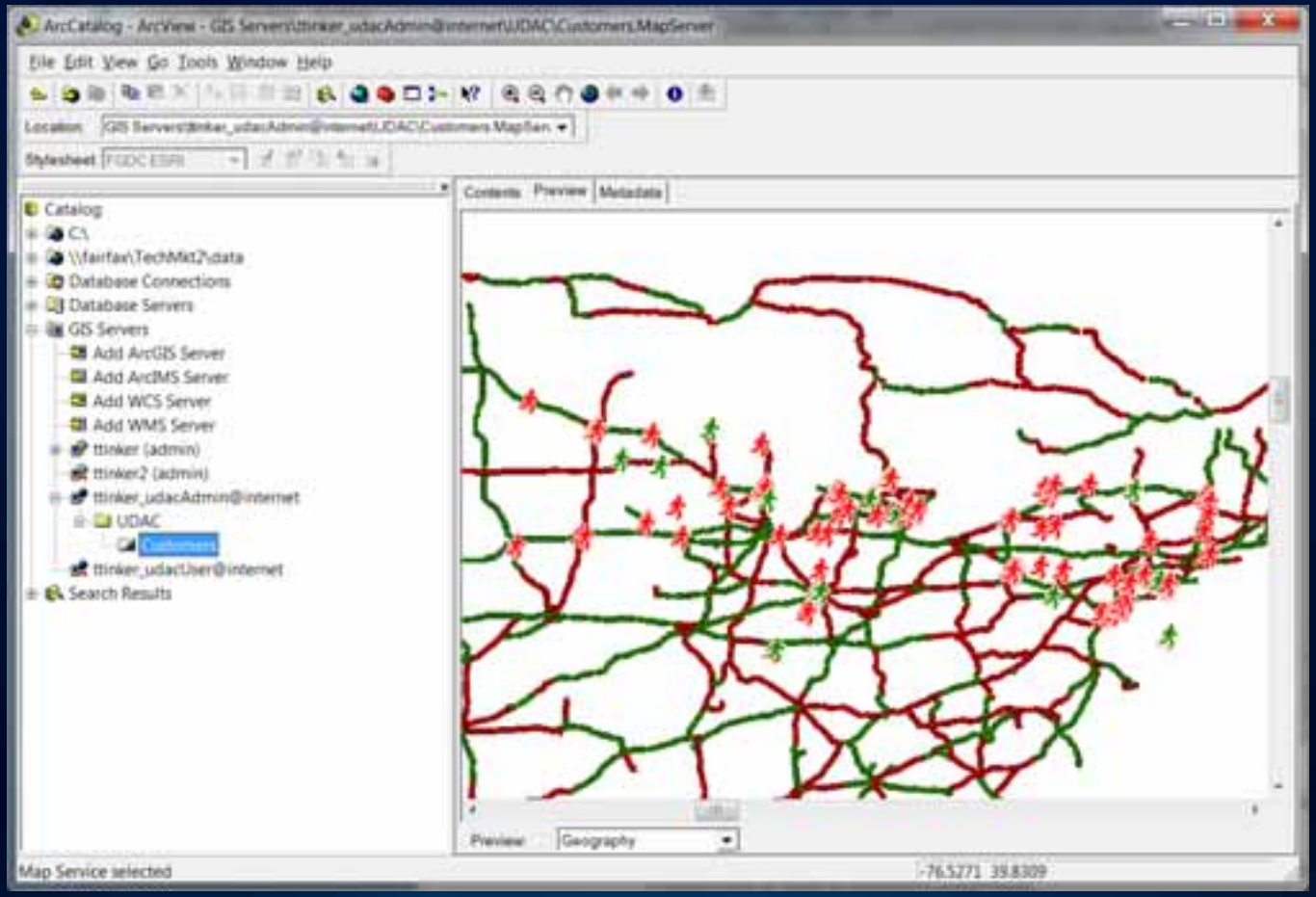
- Web Server
  - MS IIS

- Application Server
  - Java ArcGIS Server 10
  - LDAP (Derby) Users & Groups Security Provider

- Oracle Database
  - Proxy user sessions
  - Table level access (Layer security)

Integrated Security Model

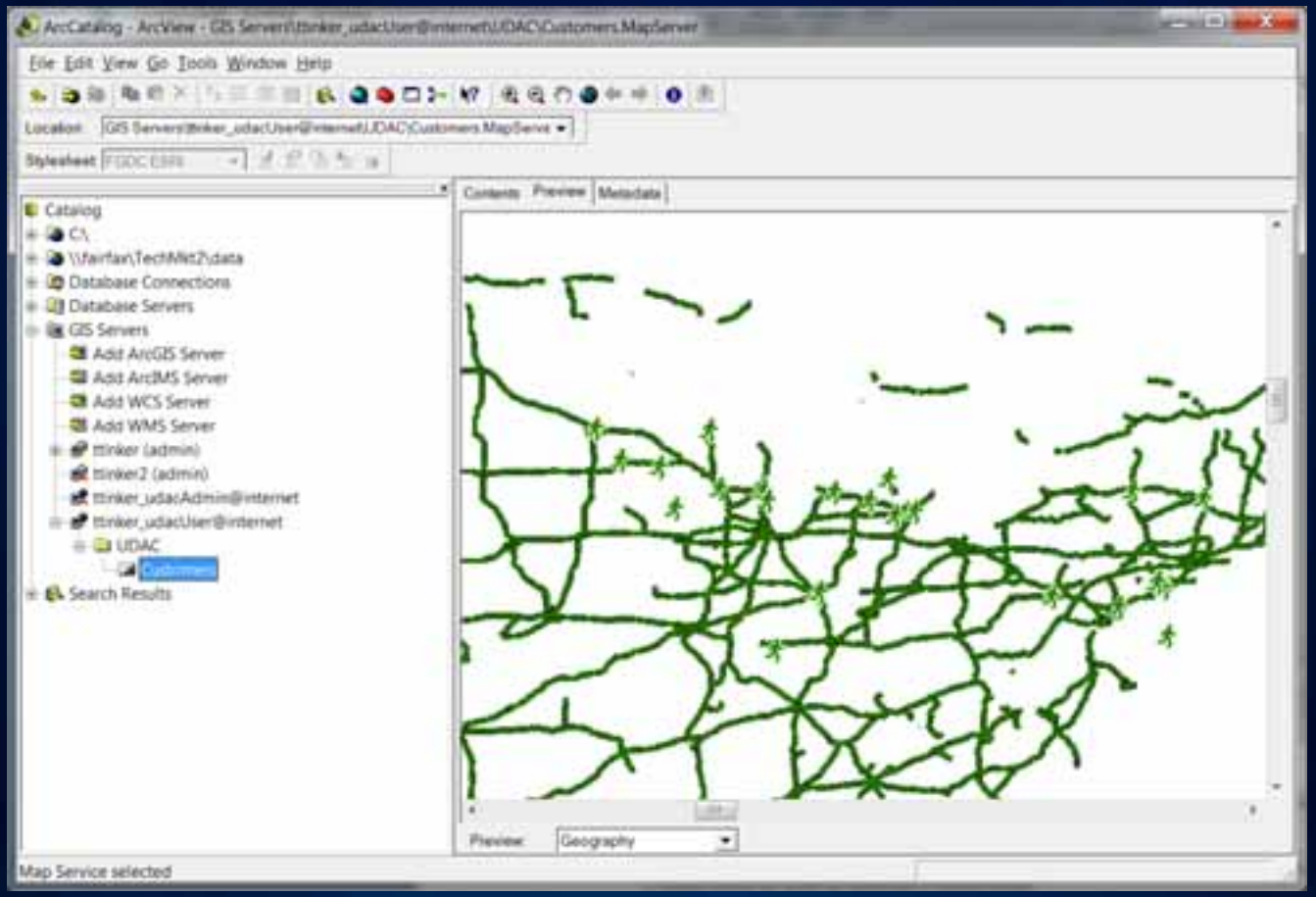
A Quick Peek At Row Level Security



Web Service User with Permissions to both High (Red) and Low (Green) Features

Integrated Security Model

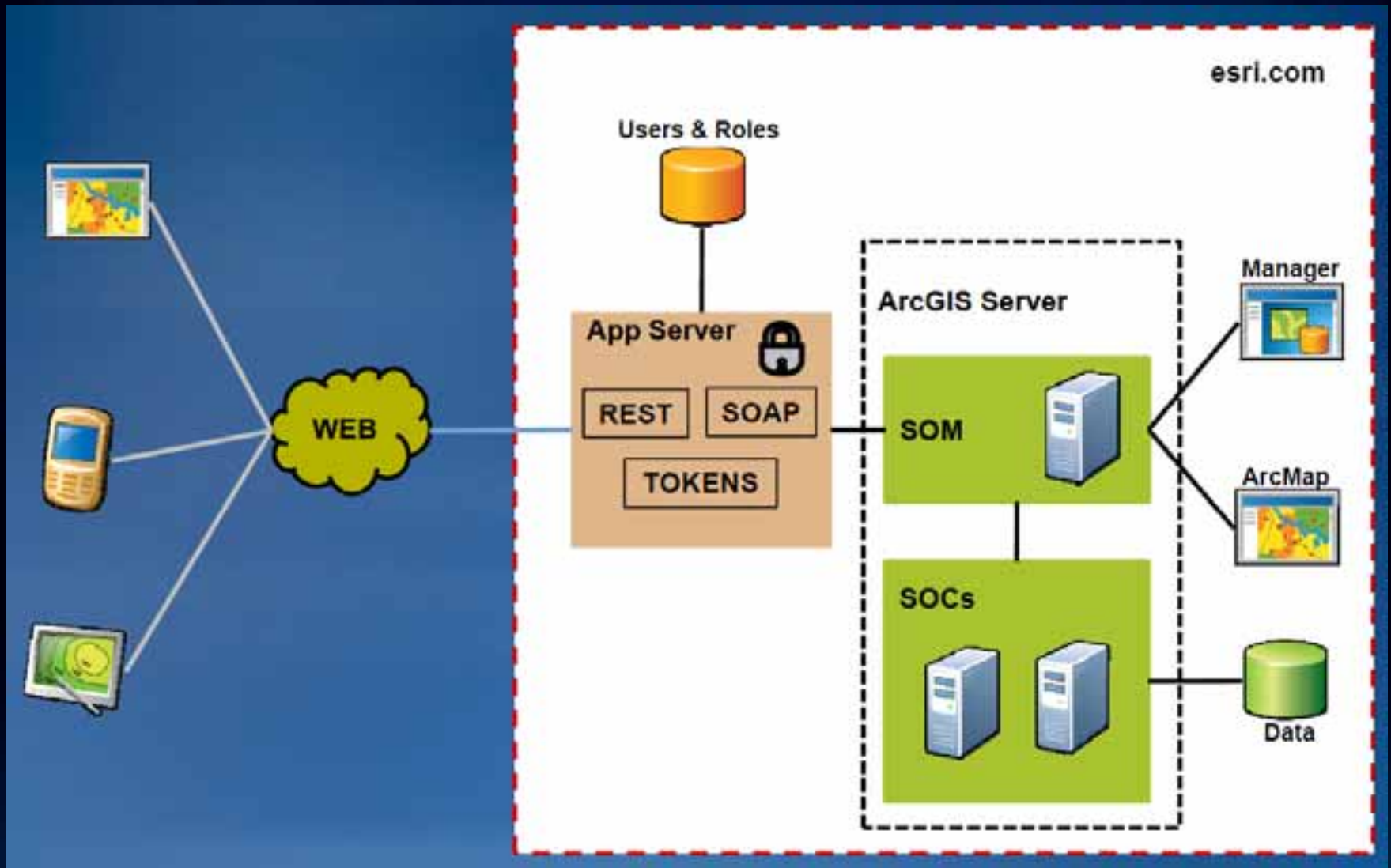
Geospatial Security Paradox



As Expected: Web service user with Low access only shows Green (Low)
Paradox: Lack of information can be information. Road gaps above can be intuitively "filled in"

ArcGIS Server Security

Security Model



ArcGIS Server Security

User Local Access to SOM

- **Windows**
  - **Access managed by operating system of SOM machine**
- **Solaris and Linux**
  - **Users managed by ArcGIS Server Manager**
- **Add users to appropriate group**
  - **Simplistic access levels (None, Read, Full)**

agsusers

- View and access services

agsadmin

- Add, delete, or modify services
- Start, stop, or pause services
- Add, remove, or modify server directories
- Create Web mapping applications
- Add or remove SOC machines
- View statistical information

ArcGIS Server Security

Server Data Access

- **Share folders that contain GIS resources**
  - **Grant SOC account Read and/or Write permission to the folder**

- **Add SOC as a user of your database**
  - **Grant SOC account Read and/or Write permission to each geodatabase**

ArcGIS Server Security

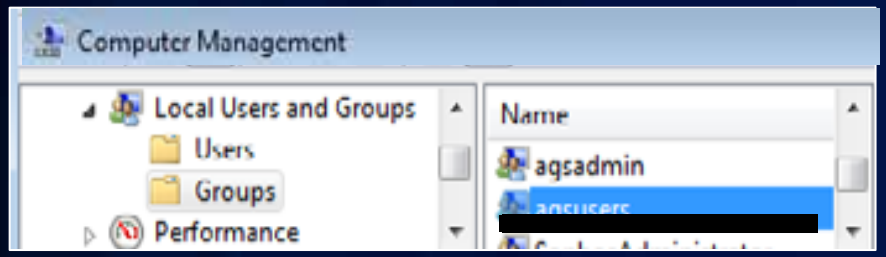
Management User Interface Access

- ArcGIS Services Directory
  - Available as part of ArcGIS Server installation
  - Typically not exposed for Standard security needs to public
- REST API Admin
  - Manages access to local ArcGIS Services Directory
  - Maintains REST cache
  - Requires membership in agsadmin group
  - Recommend to configure no public access
- ArcGIS Manager
  - Recommend to configure no public access

ArcGIS Server Security

GIS resource access

Local security



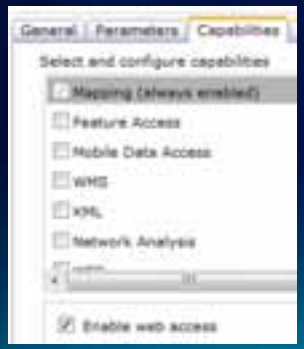
Web security

Internet

Intranet

http://...

Service capabilities



ArcGIS Server

ArcGIS Server Security

Implementing Web Access Control

1. Implement SSL
2. Choose user/role store
3. Assign users to roles (as necessary)
4. Assign roles to resources
5. Enable security

ArcGIS Server Security

Authenticating to services with Token

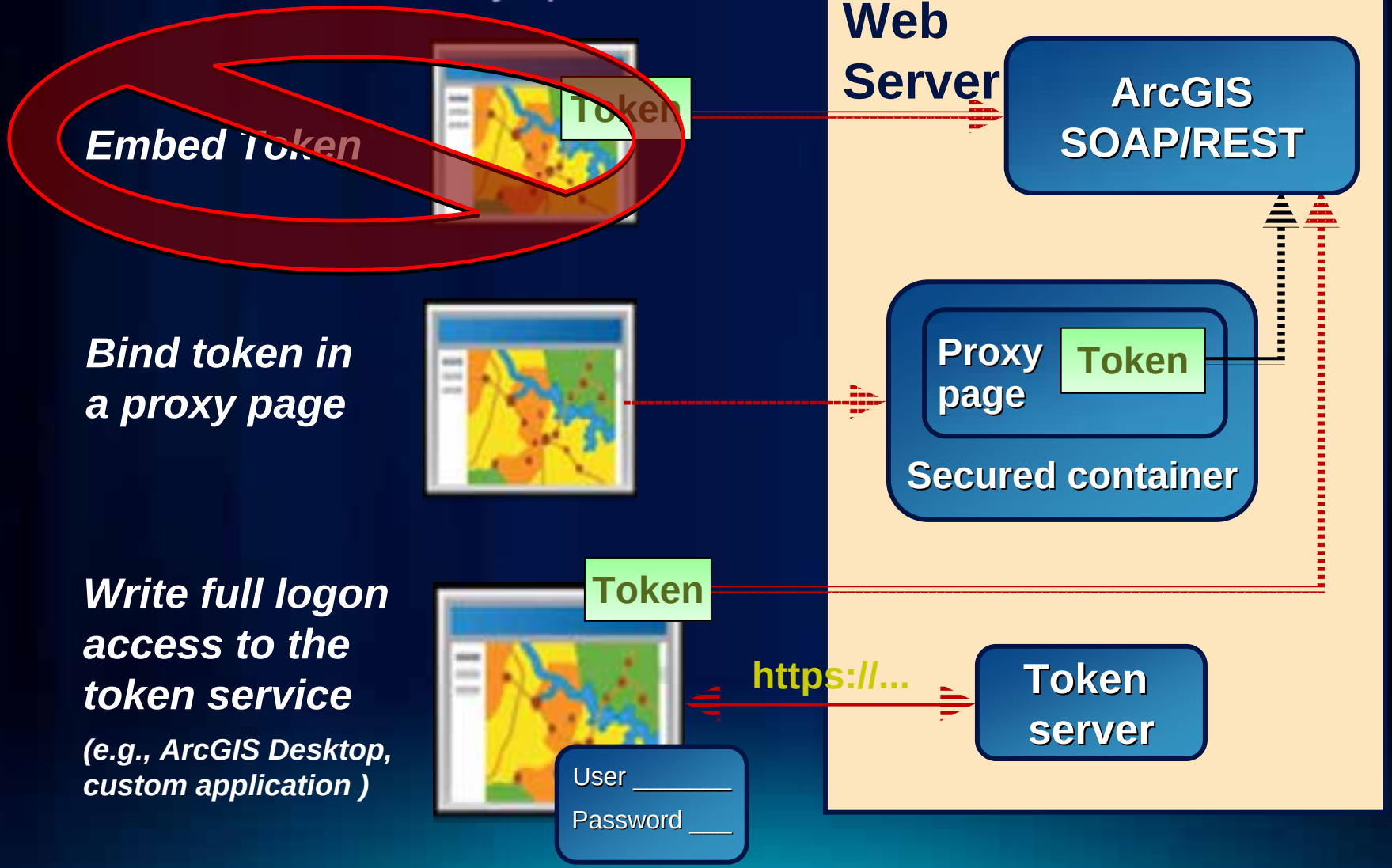
- **What is a token?**

```
hpWKwqlTkOKiQipeXmyKQEGJzAfZZsVxYVD1%2b5XCWN
```

- **Why do you need it?**
  - **Services don’t have a logon user interface**
- **How does it work?**
  - **ArcGIS Server Token Service**
- **Where do you get it?**
  - **Request a Token from Token Service**

ArcGIS Server Security

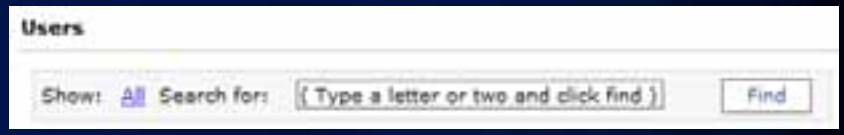
Web Service API Security Options



ArcGIS Server Security

Version 10 Security Enhancements

- AGS Manager
  - Searchable user/roles
  - Application Level User Activity Logging



- Database level security option
  - Added to REST API
  - Passes user context to database
  - Control all data access at data tier

- Web Service Interface Security Improvements

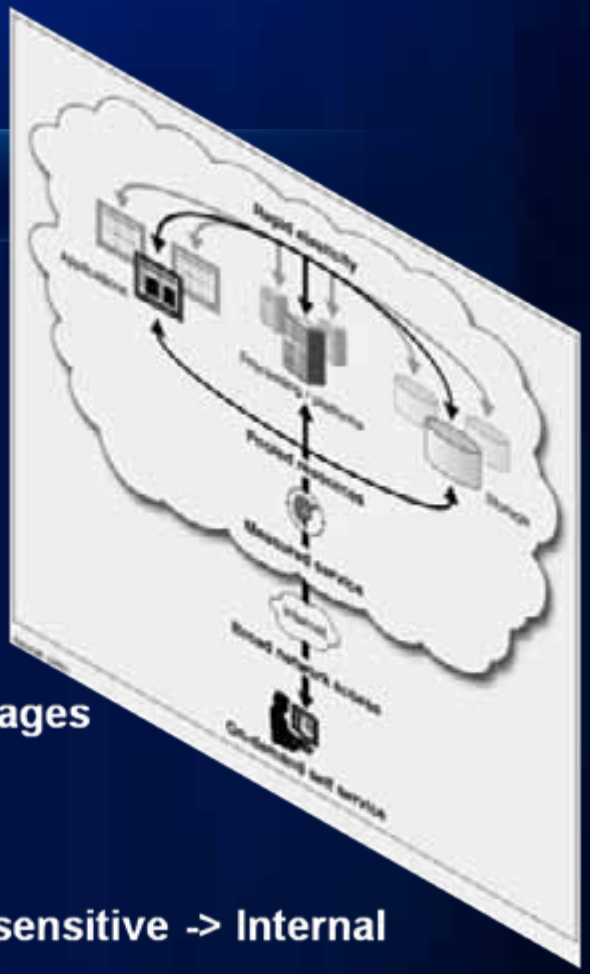
ArcGIS Server Security

What lays ahead?

- **ArcGIS Server 10.1**
  - **Say goodbye to DCOM**
  - **Adding a publisher role**
  - **Administrative API access**

Geospatial Cloud Computing Security

Geospatial Cloud Security



Is Cloud computing safe?

- Classic answer: It depends…

Security Benefits

- Virtualization / Automation
  - Expedite secure configurations with images
- Broad network access
  - Reduce removable media needs
  - Segmentation - Public data -> Cloud & sensitive -> Internal
- Potential economies of scale
  - Lower cost backup copies of data
- Self-service technologies
  - Apply security controls on demand

Geospatial Cloud Security

Risks

- Vendor Practice Dependence
  - Potential sub-standard security controls
  - Loss of governance over data
- Vendor Lock-In
  - Services termination data loss
  - Portability
  - Lost internal capabilities to support
- Sharing resources (Multi-tenancy)
  - Access to other's data
  - Unclear security responsibilities
  - Increased data transmitted = Increased disclosure risk
- Deployment Model Threat Exposure Levels
  - Private = Lowest Community = More Highest = Public

Geospatial Cloud Security

Cloud platforms utilized by Esri

- System Admin Access (IaaS)
  - ArcGIS Server on Amazon EC2
  - Terremark Cloud (Now Verizon)
  - Private Cloud
- Developer Access (PaaS)
  - Esri Web Mapping APIs (JavaScript, Flex, Silverlight)
  - Microsoft Azure ArcGIS Applications
- End User Solutions (SaaS)
  - ArcGIS Online
  - Business Analyst Online
  - ArcGIS Explorer Online

Geospatial Cloud Security

Which Cloud Deployment Model?

- **Cloud Deployment Location**
  - **Public (e.g Amazon)**
  - **Private (e.g. Internal Corporate)**
- **Primary driver -> Security**
- **Organizations from midmarket up, will have a mix of public & private**
  - **June 2010 IDC IT Executive Survey**

Geospatial Cloud Security

What are your Security Needs?

- Assess your security needs
  - Data sensitivity
    - Public domain, sensitive, classified
  - User types
    - Public, internal
  - Categorize security needs
    - Basic, standard, advanced

- Most public cloud implementations are basic
  - Security similar to social networking sites (Facebook)
  - Most GIS users have only basic security needs

Geospatial Cloud Security

Hot topics

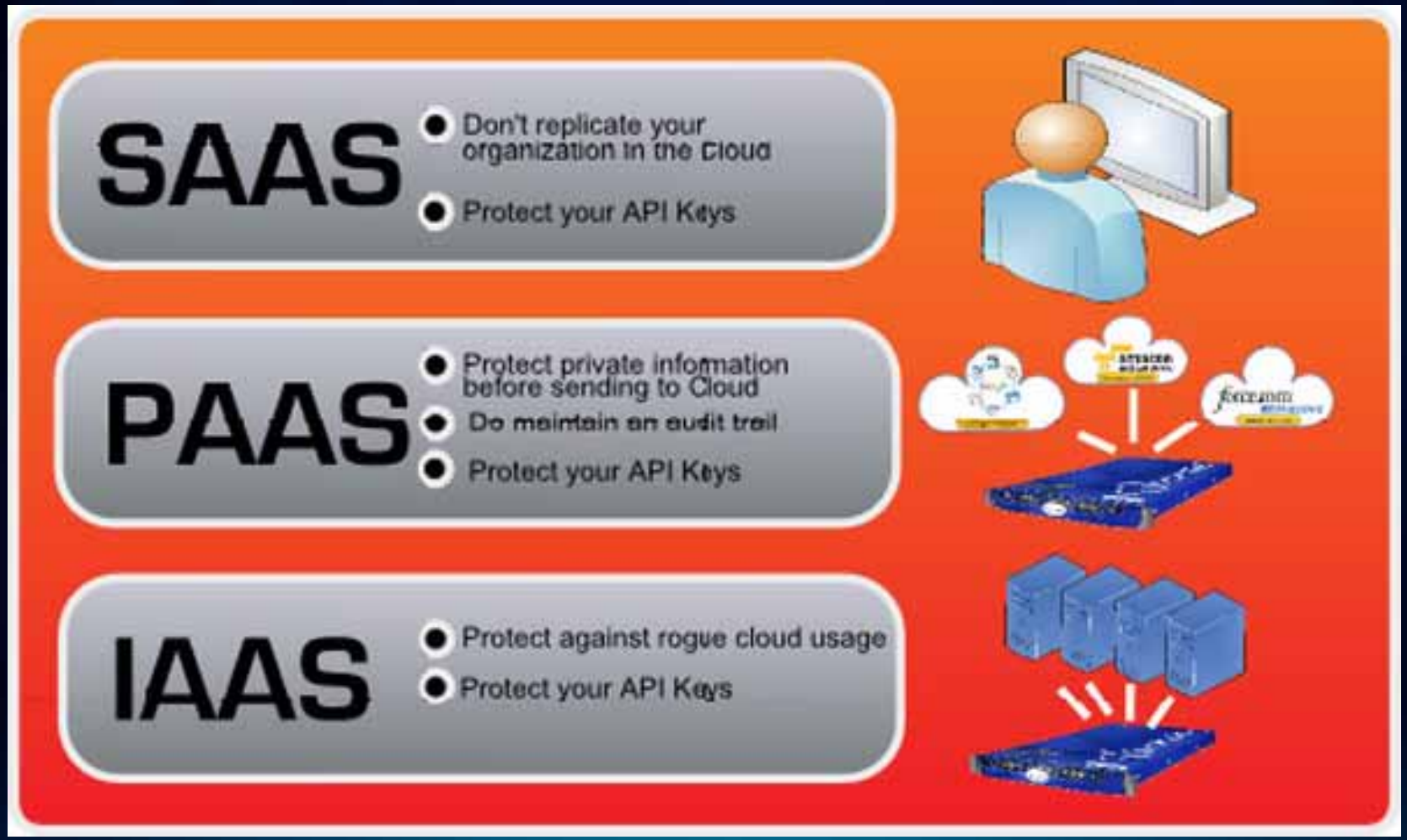
- Data Location
  - International concerns with Patriot Act
  - Some Cloud providers don’t assure location

- Identity Management
  - Long-term vision formulating
    - National Strategy for Trusted Identities (Released 6/25/10)

- Shared Responsibility Model
  - Details not delineated
  - Regulatory compliance questionable

Geospatial Cloud Security

Cloud Best Practices by Platform

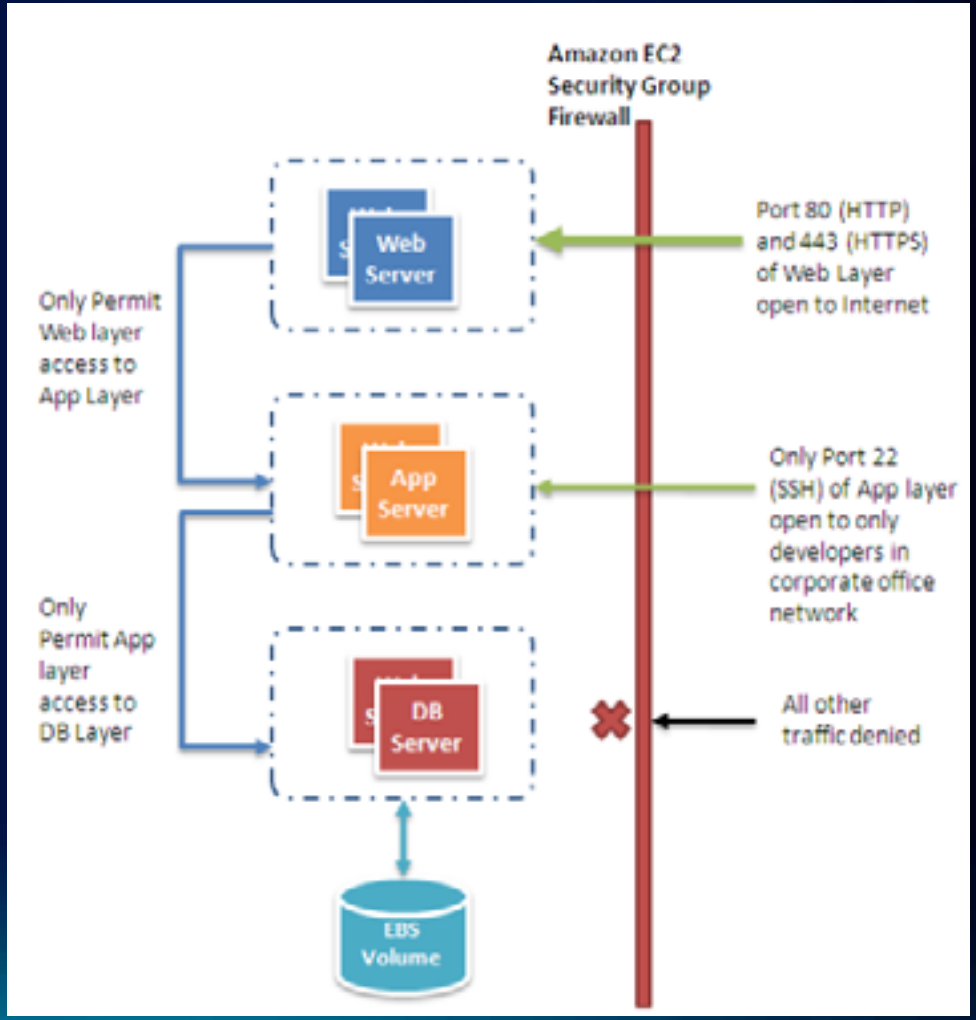


CSO: SaaS, PaaS, and IaaS: A security checklist for cloud models

Geospatial Cloud Security

IAAS Best practices

- **Similar to internal ops**
  - **Break up tiers**
  - **Protect in transit**
  - **Protect at rest**
  - **Credential management**
  - **Built-in OS Firewalls**
  - **AGS App Security**



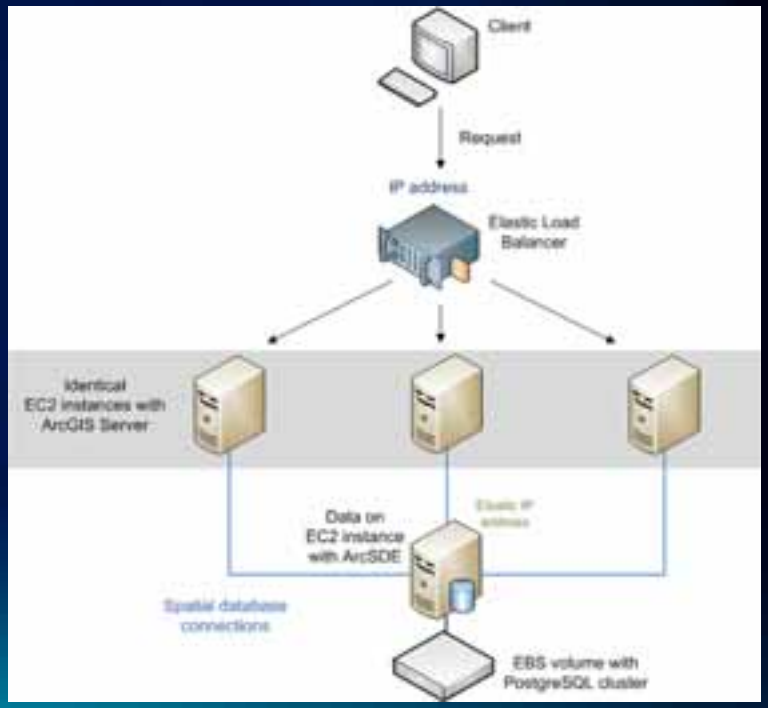
Geospatial Cloud Security

ArcGIS Server on Amazon EC2

- **Default**
  - **Web and App Tiers combined**
- **Scaling out**
  - **Elastic Load Balancing**
  - **What about supporting infrastructure?**

Default Deployment

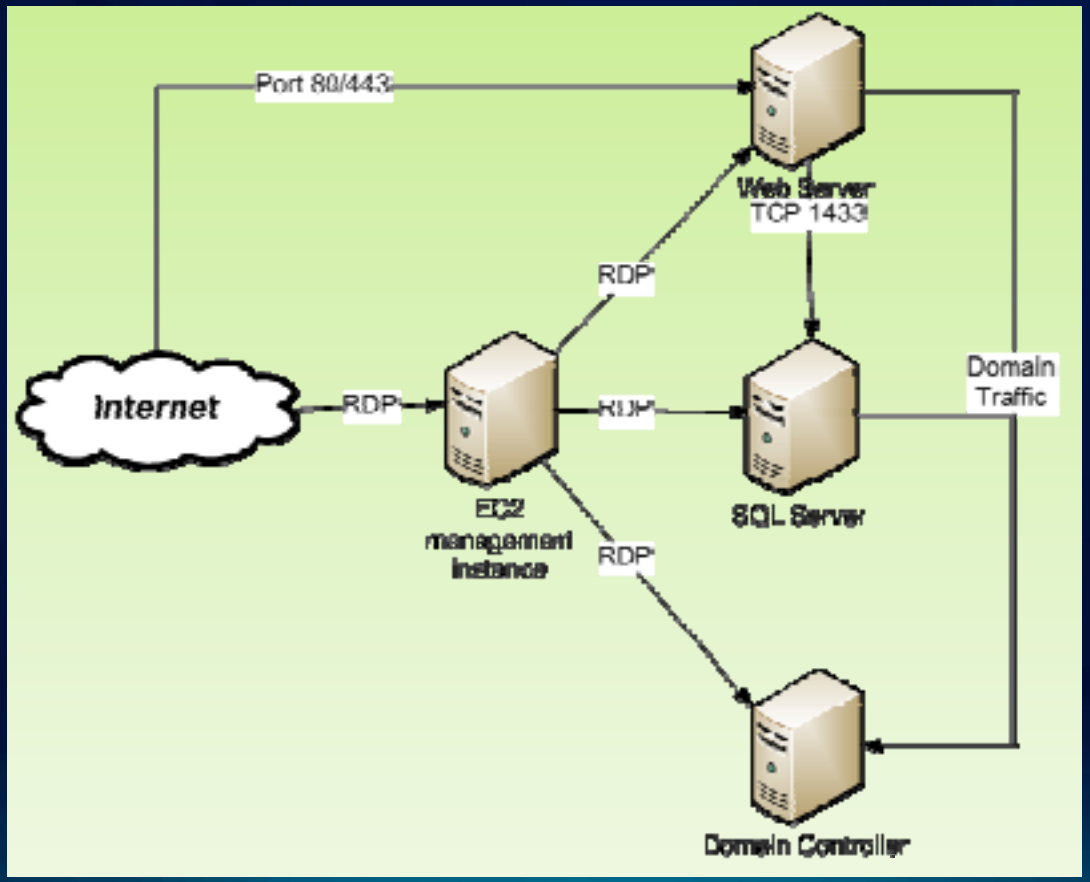
Scaling Out



Geospatial Cloud Security

ArcGIS Server on Amazon EC2

- **Minimize your administrative attack surface**



Geospatial Cloud Security

Amazon EC2 Security

- Secured physical facilities
- Logically secure EC2 instances
- Configurable firewall to control ingress access
- Standard ArcGIS Server security
- Optional multifactor authentication

- What about the users of EC2?

Geospatial Cloud Security

Amazon EC2 Security

Utilize the security guidelines available

Geospatial Cloud Security

Product Specific Guidance

- **ArcGIS Server on Amazon EC2**
  - **AMI not hardened beyond Windows 2008 Server defaults**
  - **Creating security hardened AMI**
    - **Part of GeoCloud initiative**
  - **Basic Esri Online Help guidance**
  - **Amazon Security Best Practices (Jan 2011)**
- **ArcGIS Online Sharing Content**
  - **Online Help – Sharing Content / Participating in Groups**
  - **Recent SAS70 Type 2 review of Esri hosting services**

Summary

Summary

Designing an Enterprise GIS Security Strategy

1. **Identify your Security Needs**
   - Assess your environment
   - Utilize patterns
2. **Understand Current Security Trends**
3. **Understand Security Options**
   - Enterprise GIS Resource Center
     - Enterprise-wide Security Mechanisms
     - Application Specific Options
4. **Implement Security as a Business Enabler**
   - Improve appropriate availability of information

Summary

- **Security is NOT about just a technology**
  - **Understand your organizations GIS risk level**
  - **Utilize Defense-In-Depth**
- **Secure Best Practice Guidance is Available**
  - **Check out the Enterprise GIS Resource Center!**
  - **Drill into details by mechanism or application type**
  - **Professional Services Enterprise GIS Security Assessment**
- **Cloud Computing for GIS Has Arrived**
  - **Security is evolving quickly**
  - **Security in the cloud is a shared responsibility**

Summary

Need more?

- ArcGIS Server Application Security UC Sessions
  - Building Secure Applications
    - Thurs 1:30-2:45
- Professional Services Offering
  - Enterprise GIS Security Review
  - http://www.esri.com/services/professional-services/implementation/enterprise.html

Summary

Resources

- Esri Enterprise GIS Resource Center (Security)
  - http://resources.arcgis.com/content/enterprisegis/10.0/security
- CSI Computer Crime and Security Survey 2010-2011
  - http://gocsi.com/survey
- Web Browser Security Test Results Summary: Q1 2010
  - http://nsslabs.com/test-reports/NSSLabs_Q12010_BrowserSEM_Summ_FINAL.pdf
- Windows on Amazon EC2 Security Guide
  - http://developer.amazonwebservices.com/connect/entry.jspa?externalID=1767
- Selected Documents on Confidentiality and Geospatial Data
  - http://sedac.ciesin.columbia.edu/confidentiality/SelectedDocuments.html
- SaaS, PaaS, and IaaS: A Security Checklist
  - http://www.csoonline.com/article/660065/saas-paas-and-iaas-a-security-checklist-for-cloud-models

Summary

Resources

- NIST Information Security Publication Website
  - http://csrc.nist.gov/publications/PubsSPs.html
- Providing SSO To Amazon EC2 From An On-Premises Windows Domain
  - http://download.microsoft.com/download/6/C/2/6C2DBA25-C4D3-474B-8977-E7D296FBFE71/EC2-Windows%20SSO%20v1%200--Chappell.pdf
- DOE Argonne National Labs Security Maxims
  - http://www.ne.anl.gov/capabilities/vat/pdfs/security_maxims.pdf
- GAO Guidance Needed with Implementing Cloud Computing
  - http://www.gao.gov/new.items/d10513.pdf
- FY 2010 Report to Congress on Implementation of FISMA
  - http://www.whitehouse.gov/sites/default/files/omb/assets/egov_docs/FY10_FISMA.pdf
- Best Practices for sharing sensitive environmental geospatial data (2010)
  - http://www.geoconnections.org/publications/Key_documents/Sensitive_Env_Geo_Data_Guide_EN_v1.pdf

Summary

Contact Us At:

Enterprise Security esinfo@esri.com

Michael Young myoung@esri.com

Where Do You Need More Security Guidance From Esri?

Don't Forget To Fill Out Your Survey at:

www.esri.com/sessionevals


esri