

# Best Practices for Administering ArcGIS Enterprise

Richard Kaufholz

Cameron Muller



*THE SOUTHERN AFRICA ESRI USER CONFERENCE 2023*



# Customizing ArcGIS Enterprise

Cameron Muller



# What is Involved

## Consistent branding

- Portal home page
- Sites
- Logos & branding
- Content governance
- Information banners
- Linking externally
- Application templates/standards





# Demo One: Customizing ArcGIS Enterprise

# Tips and Tricks

## Helpful resources/recommendations

- Self-help content
  - Always include help guides
- ArcGIS Hub Gallery
- Documentation of standards
  - Ensure **accountability**
  - Enforces a **standard**

### 6.4.1.8 Categories

To better organise and support discovery, items should be assigned to one or more of organisational categories.

Category	Sub-category
Administrative Boundaries	
Agriculture	
Boreholes	
Climate	
Community Services	
Cultural	
Demographic	
Disaster Management	
Elevation and Depth	
Environment	
Functional Boundaries	
Geochemistry	
Geology and Soils	
Geophysics	
Grids and Extents	
Hazards	
Hydrology	
Imagery	Core photos
Imagery	Hyper-spectral
Imagery	Location photos
Imagery	Multi-spectral
Imagery	<u>Orthoimagery</u>
Infrastructure	Building
Infrastructure	Communication

### 6.4.2.3 Services Metadata

Service metadata is stored with all items in ArcGIS Enterprise and can be created and managed within ArcGIS Enterprise, or alternatively can be read from source during the publication process. The source metadata aligns to the item metadata – see section 6.4.3.4 for more details.

Service metadata to be captured and managed within the GIS:

ArcGIS Metadata Field	Value	Example
Title	Descriptive single term or single phrase. No underscores or special characters	<i>Power Reticulation Plan</i>
Summary	Short summary (snippet) that is used on gallery cards such as the Sites/Pages	<i>This plan covers all Power Reticulation infrastructure and features.</i>
Description	Detailed description of the data	<i>Sourced from the site survey department and updated every month.</i>
Owner	Content owner in GIS.	<i><a href="#">GIS@Spatial</a></i>
Date Created	Date when the item was created (published) in ArcGIS	<i>24 October 2023</i>
Terms of Use	Standard statement related to the security level of the data as per organisation requirements.	<ul style="list-style-type: none"><li>- <i>Unclassified</i></li><li>- <i>Internal</i></li><li>- <i>Confidential</i></li><li>- <i>Highly Restricted</i></li></ul>
Categories	List of organisational categories, one or more of which must be assigned to the item	<i>Engineering</i>
Tags	User-defined tags (keywords) that support searchability of the item	<i>Power, Utility</i>
Credits	Any reference to required attribution (shown on maps that use/show the item)	<i>Esri South Africa</i>

# Security Best Practices

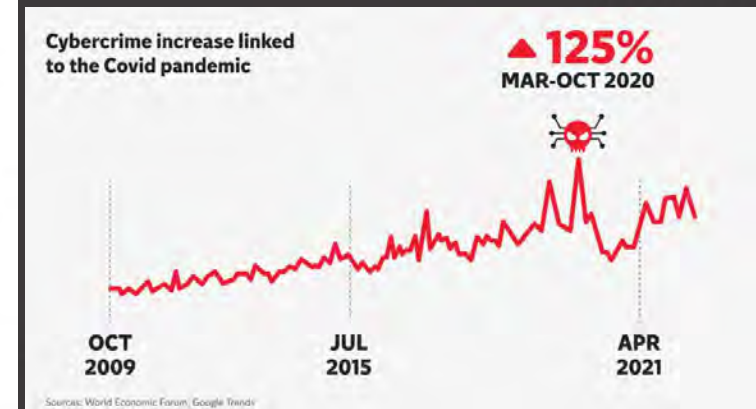
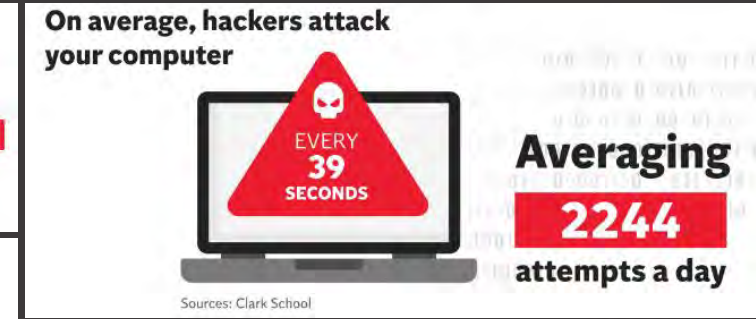
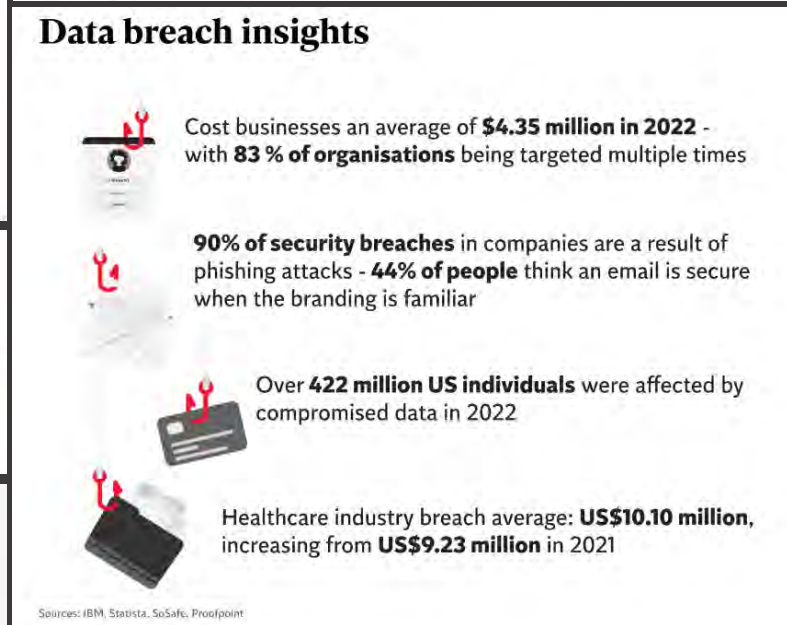
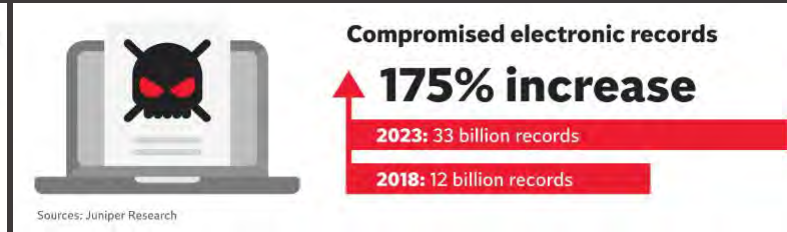
Cameron Muller





# Security Best Practices

## Global cybercrime statistics



# Security Best Practices

Security as a base

- Authentication
- Authorisation
- Encryption
- Filtering applications and methods
- ArcGIS Enterprise Logs



# Security Best Practices

## Authentication

- Verification of who you say you are
- Methods:
  - Built-in
  - Active Directory
  - SAML
  - MFA
- User experience starts here...

### **Zero trust architecture:**

- *It removes implicit trust (“This user is inside my security perimeter”) and replaces it with adaptive, explicit trust (“This user is authenticated with multifactor authentication from a corporate laptop with a functioning security suite”) – Gartner, 2023*

# Security Best Practices

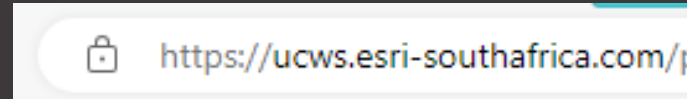
## Authorisation

- Determines a user's or applications level of access
- Methods:
  - Groups
  - Roles
  - AD Group Integration

# Security Best Practices

## Encryption

- SSL (Internal & external)
- TLS (1.0 & 1.1\*)
- Expiry dates
- Always encrypt traffic



Validity Period

Issued On	Friday, January 27, 2023 at 2:00:00 AM
Expires On	Sunday, January 28, 2024 at 1:59:59 AM

Policies

HTTPS

Allow access to the portal through HTTPS only.

Security Configuration

**Protocol:** HTTPS Only

**SSL Protocols:** TLSv1.2, TLSv1.3

**SSL Cipher Suites:** TLS\_ECDHE\_RSA\_WITH\_AES\_256\_GCM\_SHA384, TLS\_ECDHE\_RSA\_WITH\_AES\_256\_CBC\_SHA384, TLS\_ECDHE\_RSA\_WITH\_AES\_256\_CBC\_SHA, TLS\_RSA\_WITH\_AES\_256\_GCM\_SHA384, TLS\_RSA\_WITH\_AES\_256\_CBC\_SHA256, TLS\_RSA\_WITH\_AES\_128\_GCM\_SHA256, TLS\_RSA\_WITH\_AES\_128\_CBC\_SHA256

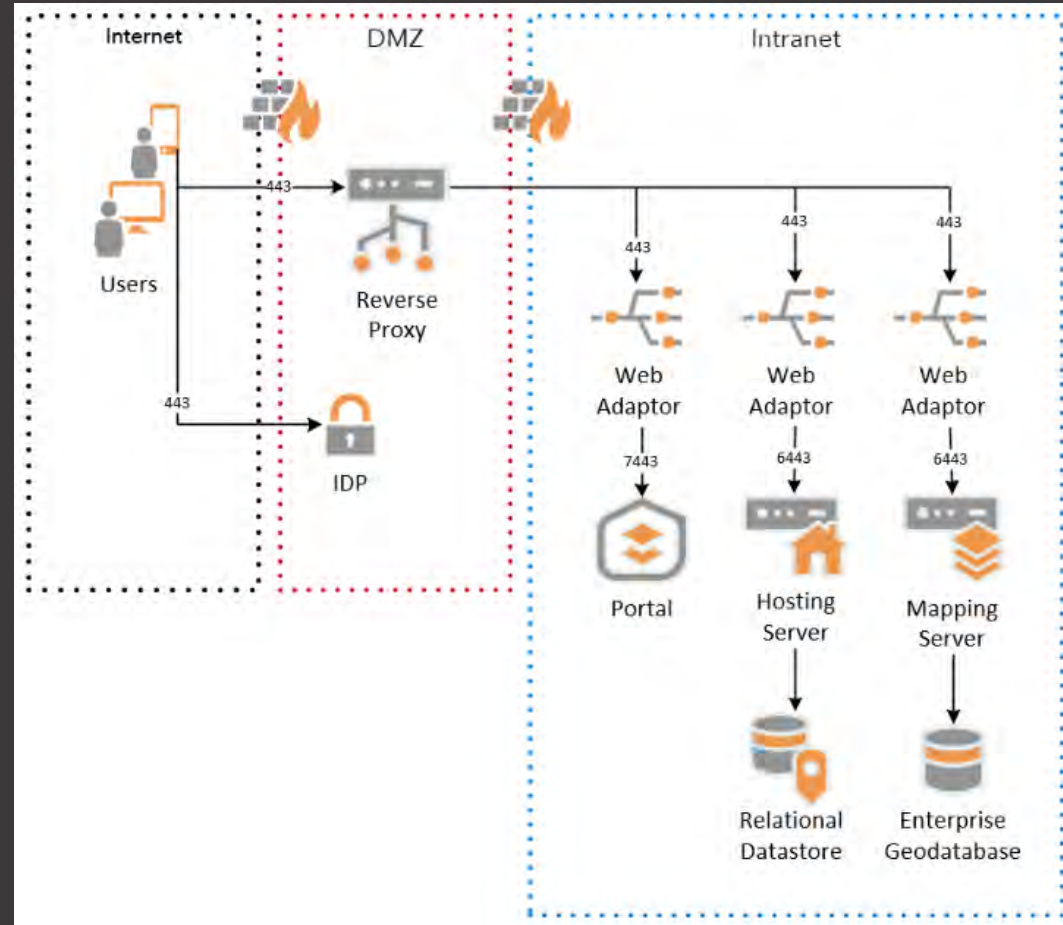
**HTTP Strict Transport Security (HSTS) enabled:**



# Security Best Practices

## Filtering

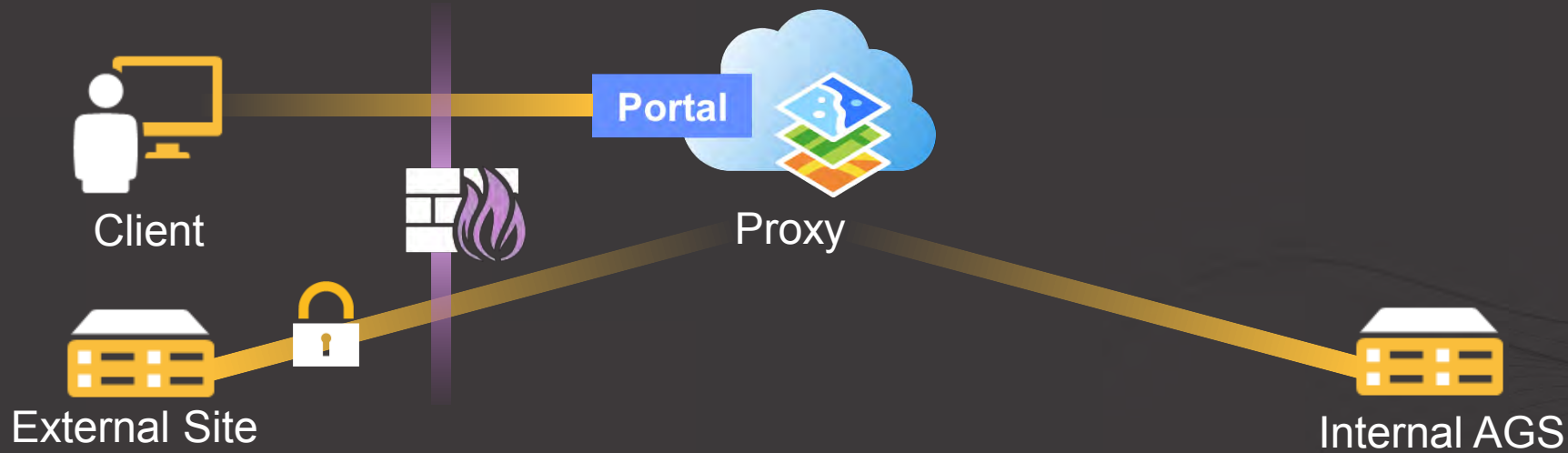
- Web Adaptor
- Load Balancer/Application Gateway
- DMZ/Perimeter Network
- Reverse Proxies



# Security Best Practices

## Filtering – Portal Proxy

- Controls **remote servers** which are allowed to be accessed by Portal for ArcGIS
- **No** restrictions by default – anything can be accessed
- Restricting servers ensures **validity** of the source



# Security Best Practices

## Filtering – Portal Proxy

- Controls **remote servers** which are allowed to be accessed by Portal for ArcGIS
- **No** restrictions by default – anything can be accessed
- Restricting servers ensures **validity** of the source
- `allowedProxyHosts` > Comma separated list of domains

Portal Administrator Directory Logged in

[Home](#) > [Security](#) > [Config](#) > [Update Security Configuration](#)

### Update Security Configuration

```
Configuration (in JSON format) *  
{  
  "disableServicesDirectory": false,  
  "enableAutomaticAccountCreation": true,  
  "webgisServerTrustKey": "yPy+XQlEYMP0EqEyzps1obFKiww+Hpj13a2wE17eL/M=",  
  "allowedProxyHosts": "dvw-cmuller-uc.esridev.co.za,ucws.esri-southafrica.com"  
}
```



# Security Best Practices

## Security improvements

- Disabling of server manager
- Password governance\*
- Disabling of service directories\*
- Cross-origin resource sharing (CORS)

# Security Best Practices

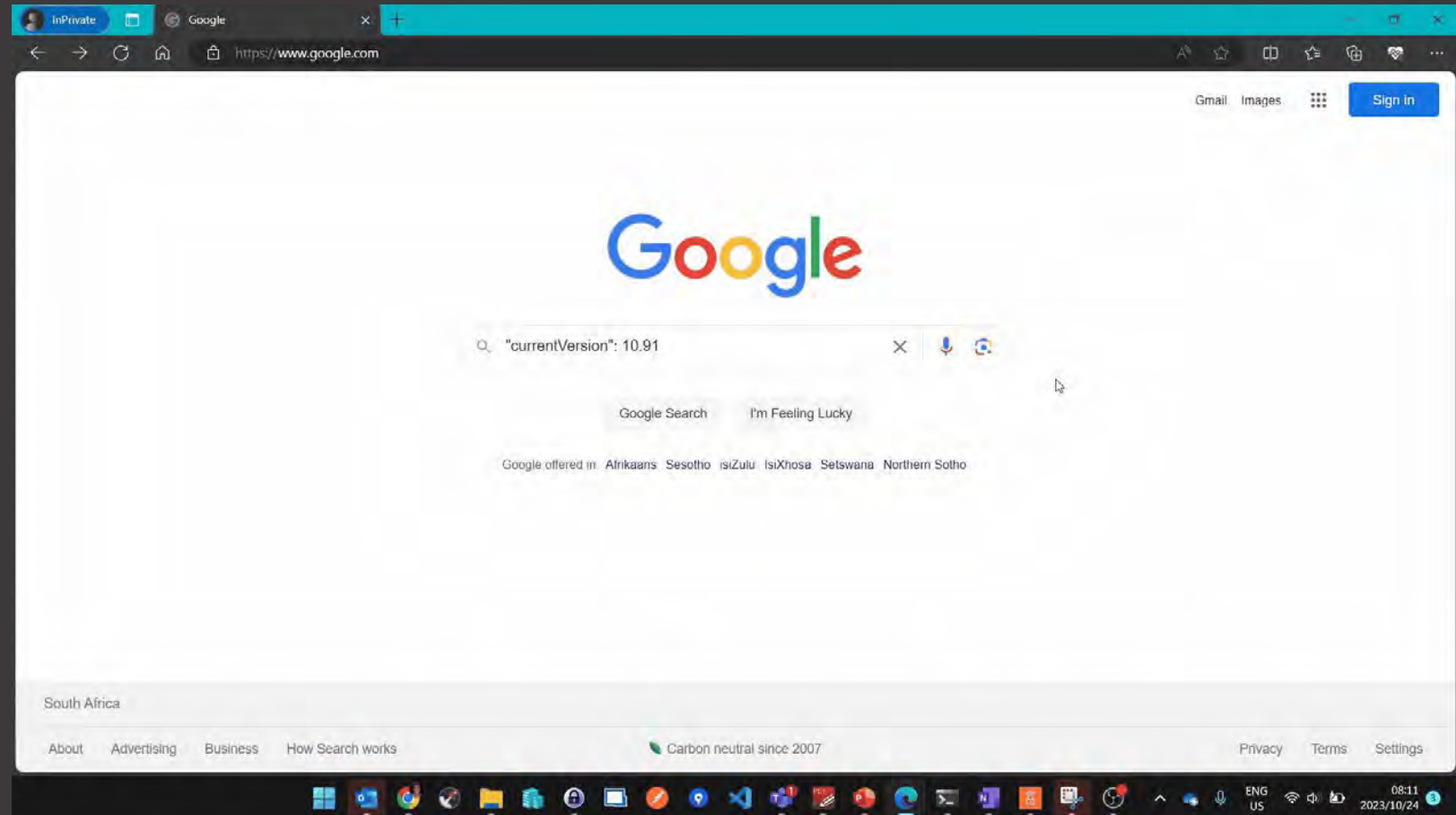
Security improvements - Services Directory

- Can your **services** be found?
- **Keyword** search

# Security Best Practices

## Security improvements - Services Directory

- Can your **services** be found?
- **Keyword** search





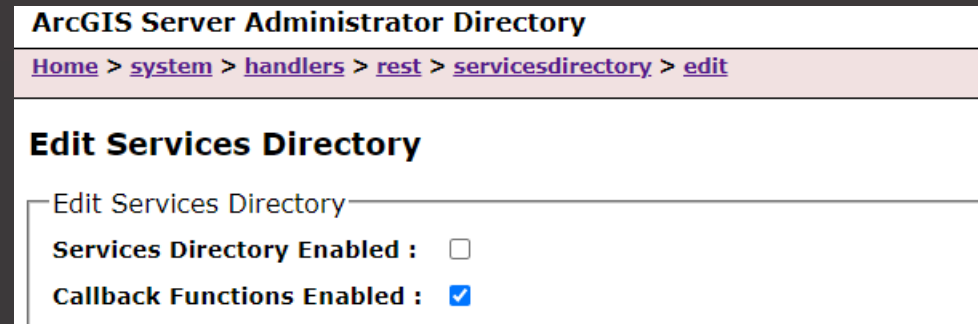
# Security Best Practices

## Security improvements - Disabling Services Directory (Server)

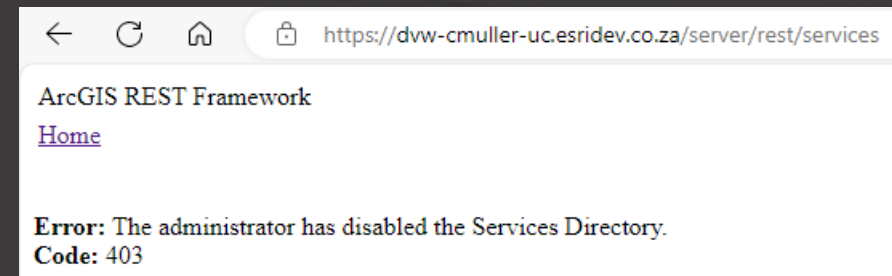
- **No** impact on Portal/Server directly
- **Reduces** Bots and Cross-site scripting (XSS)



A screenshot of the ArcGIS REST Services Directory web interface. The browser address bar shows the URL: <https://dvw-cmuller-uc.esri-dev.co.za/server/rest/services>. The page title is "ArcGIS REST Services Directory". Below the title, there is a breadcrumb trail: "Home > services". There are links for "JSON" and "SOAP". The "Folder: /" section shows the "Current Version: 11.1". Under "Folders:", there are links for "Hosted", "System", and "Utilities". Under "Services:", there are links for "CapeSuburbs\_ElecBilling (MapServer)", "CapeSuburbs\_WaterBilling (MapServer)", and "SampleWorldCities (MapServer)". At the bottom, "Supported Interfaces:" includes links for "REST", "SOAP", "Sitemap", and "Geo Sitemap".



A screenshot of the ArcGIS Server Administrator Directory web interface. The browser address bar shows the URL: <https://dvw-cmuller-uc.esri-dev.co.za/server/rest/services>. The page title is "ArcGIS Server Administrator Directory". Below the title, there is a breadcrumb trail: "Home > system > handlers > rest > servicesdirectory > edit". The main heading is "Edit Services Directory". Below this, there are two settings: "Services Directory Enabled : ", which is unchecked, and "Callback Functions Enabled : ", which is checked.

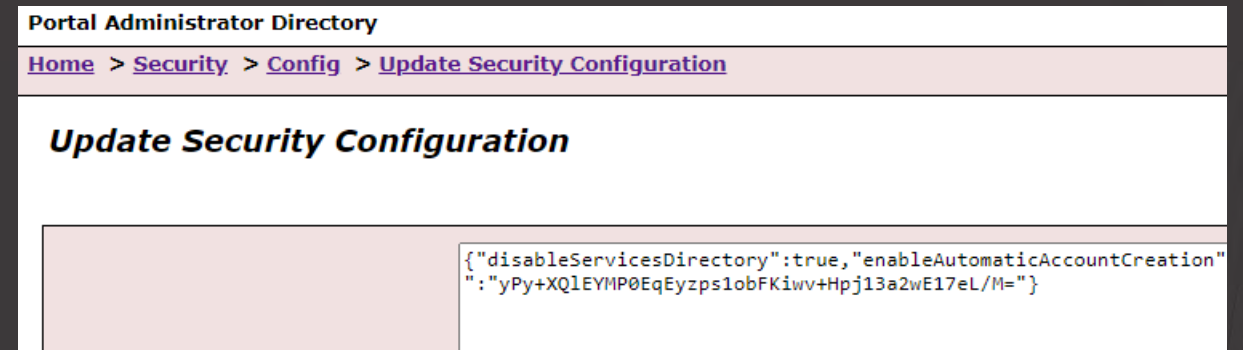
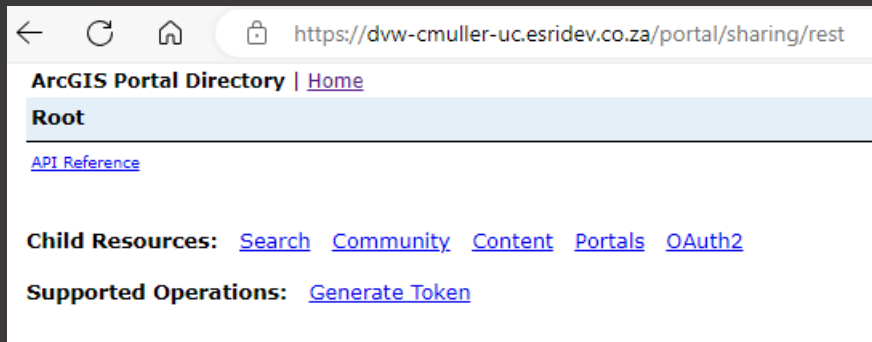


A screenshot of the ArcGIS REST Framework error page. The browser address bar shows the URL: <https://dvw-cmuller-uc.esri-dev.co.za/server/rest/services>. The page title is "ArcGIS REST Framework". Below the title, there is a link for "Home". The main content area displays an error message: "Error: The administrator has disabled the Services Directory." followed by "Code: 403".

# Security Best Practices

## Security improvements – Disabling Services Directory (Portal)

- **No** impact on Portal/Server directly
- **Reduces** Bots and Cross-site scripting (XSS)



# Security Best Practices

## Security improvements - Cross-Origin Resource Sharing (Server)

- Controls **domains** which are allowed to make **CORS requests** to your web services
  - Wildcard by default
  - Limits malicious commands
  - `system > handlers > rest > servicesdirectory`

[Home](#) > [system](#) > [handlers](#) > [rest](#) > [servicesdirectory](#) > [edit](#)

### Edit Services Directory

Edit Services Directory

Services Directory Enabled :

Callback Functions Enabled :

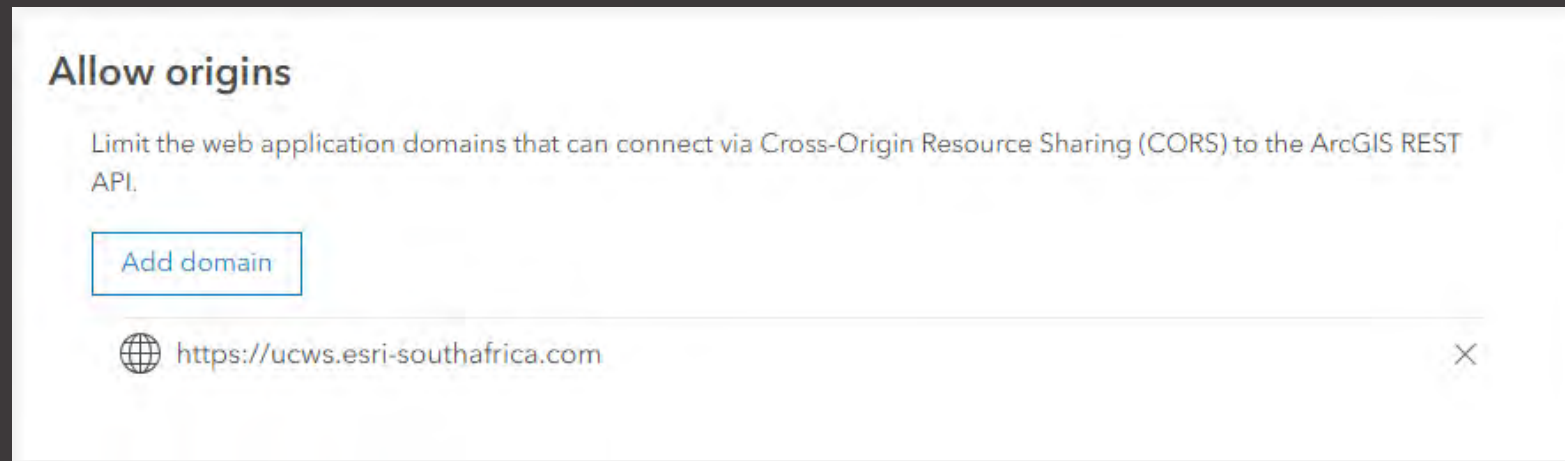
AllowedOrigins :



# Security Best Practices

## Security improvements - Cross-Origin Resource Sharing (Portal)

- Limits **external applications** which can make **CORS requests** to Portal items
- Items are accessible but **capabilities** are **limited\***
- Organization > Settings > Security



# Security Best Practices

## Security improvements - Logging

- ArcGIS Enterprise Logs
- **First** point of reference

Portal Administrator Directory

[Home](#) > [Logs](#) > [Query](#)

### Log Messages

Type	Message	Time	Source	Machine
WARNING	Sign in error: Invalid username or password specified for 'Frank'.	2023-10-22T02:16:13,344	Sharing	DVW-CMULLER-UC.ESRIDEV.CO.ZA
WARNING	Sign in error: Invalid username or password specified for 'Frank'.	2023-10-22T02:16:11,683	Sharing	DVW-CMULLER-UC.ESRIDEV.CO.ZA
WARNING	Too many invalid login attempts for user 'Evans'.	2023-10-22T02:16:08,844	Sharing	DVW-CMULLER-UC.ESRIDEV.CO.ZA
WARNING	Sign in error: Invalid username or password specified for 'Evans'.	2023-10-22T02:16:07,105	Sharing	DVW-CMULLER-UC.ESRIDEV.CO.ZA
WARNING	Sign in error: Invalid username or password specified for 'Alice'.	2023-10-22T02:16:04,76	Sharing	DVW-CMULLER-UC.ESRIDEV.CO.ZA
WARNING	Sign in error: Invalid username or password specified for 'Alice'.	2023-10-22T02:16:02,253	Sharing	DVW-CMULLER-UC.ESRIDEV.CO.ZA
WARNING	Sign in error: Invalid username or password specified for 'Charlie'.	2023-10-22T02:15:59,196	Sharing	DVW-CMULLER-UC.ESRIDEV.CO.ZA
WARNING	Sign in error: Invalid username or password specified for 'Charlie'.	2023-10-22T02:15:57,533	Sharing	DVW-CMULLER-UC.ESRIDEV.CO.ZA
WARNING	Too many invalid login attempts for user 'Jack'.	2023-10-22T02:15:54,665	Sharing	DVW-CMULLER-UC.ESRIDEV.CO.ZA
WARNING	Sign in error: Invalid username or password specified for 'Jack'.	2023-10-22T02:15:52,932	Sharing	DVW-CMULLER-UC.ESRIDEV.CO.ZA
WARNING	Sign in error: Invalid username or password specified for 'Helen'.	2023-10-22T02:15:50,8	Sharing	DVW-CMULLER-UC.ESRIDEV.CO.ZA
WARNING	Sign in error: Invalid username or password specified for 'Helen'.	2023-10-22T02:15:48,299	Sharing	DVW-CMULLER-UC.ESRIDEV.CO.ZA
WARNING	Sign in error: Invalid username or password specified for 'Bob'.	2023-10-22T02:15:45,441	Sharing	DVW-CMULLER-UC.ESRIDEV.CO.ZA

# Security Best Practices

## Where to start

- Trust.arcgis.com
  - Security Advisor
- Patching
- Built in scanning scripts:
  - Generates **HTML report** with findings and recommendations
  - <Portal for ArcGIS installation location>\tools\security
  - <ArcGIS Server installation location>\tools\admim



# Security Best Practices

## Scan.py Reports

### ArcGIS Server Security Scan Report - 10/12/23

dvw-cmuller-uc.esridev.co.za (11.1)

#### Potential security items to review

<u><b>Id</b></u>	<u><b>Severity</b></u>	<u><b>Property Tested</b></u>	<u><b>Scan Results</b></u>
SS08	Important	Cross-domain requests	Cross-domain requests for REST endpoints are unrestricted. To reduce the possibility of an unknown application sending malicious requests to your web services, it is recommended to restrict the use of your services to applications hosted only in domains that you trust. <a href="#">More information</a>
SS08	Important	Cross-domain requests	Cross-domain requests for SOAP endpoints are unrestricted; this applies to OGC endpoints (WMS, WFS, etc.) that are exposed as well. To reduce the possibility of an unknown application sending malicious requests to your web services, it is recommended to restrict the use of your services to applications hosted only in domains that you trust. <a href="#">More information</a>
SS07	Important	Rest services directory	The Rest services directory is accessible through a web browser. Unless being actively used to search for and find services by users, this should be disabled to reduce the chance that your services can be browsed, found in a web search, or queried through HTML forms. This also provides further protection against cross-site scripting (XSS) attacks. <a href="#">More information</a>
SS11	Recommended	PSA account status	The primary site administrator account is enabled. It is recommended that you disable this account to ensure that there is not another way to administer ArcGIS Server other than the group or role that has been specified in your configuration. <a href="#">More information</a>
SS14	Recommended	Server SSL certificate	To help reduce web browser warnings or other unexpected behavior from clients communicating with ArcGIS Server, it is recommended to import and use a CA-signed SSL certificate bound to port 6443. <a href="#">More information</a>

# Automating Tasks and Workflows

Cameron Muller



# Automating Workflows

## ArcGIS Notebooks Overview

- ArcGIS Python API
- Wrapper for core rest API
- Accessing the API:
  - ArcGIS Pro
  - Standalone with Conda
  - ArcGIS Enterprise/Online
  - Docker
  - Google Colab



# Automating Workflows

What can you do with ArcGIS Notebooks?

- Data Engineering
- Spatial Analysis
- Machine Learning
- Automation
- Collaboration
- Storytelling



# Automating Workflows

## Showcase

- Scenario 1:
  - Validating item metadata (Governance)
- Scenario 2:
  - Identify items using insecure URLs



# Demo Two: Automating Workflows



# Automating Workflows

## ArcGIS Notebooks Benefits

- Automation/schedules
- Large organisations
- Samples
  - <https://developers.arcgis.com/python/samples/>

# Please share your feedback in the UC2023 app

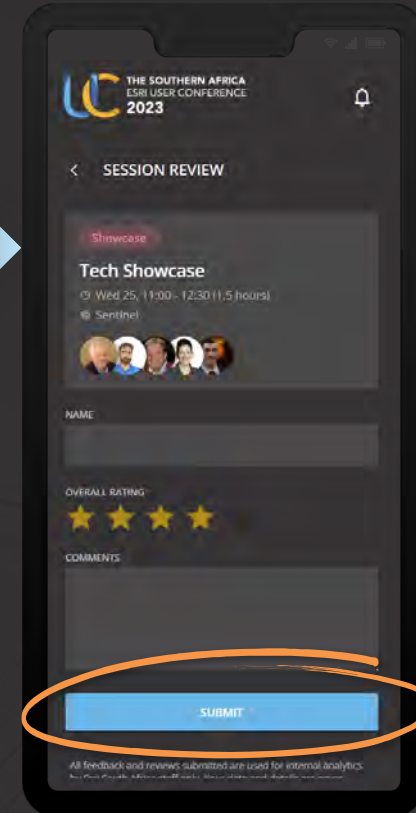
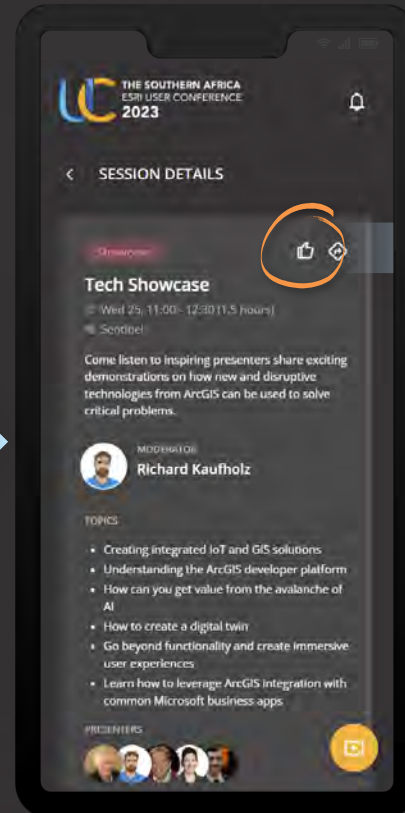
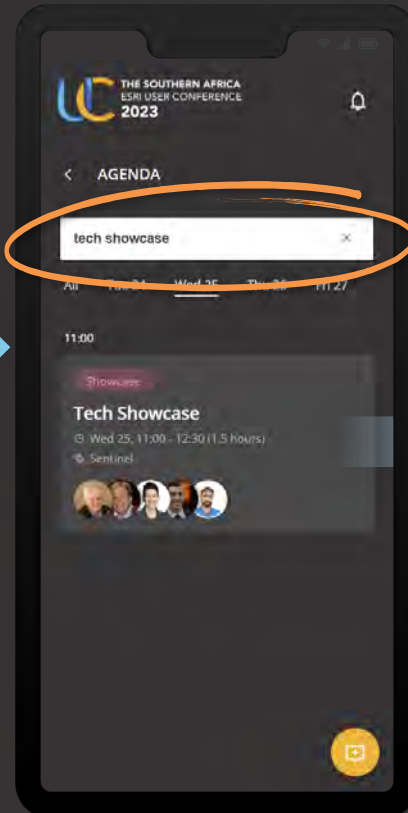
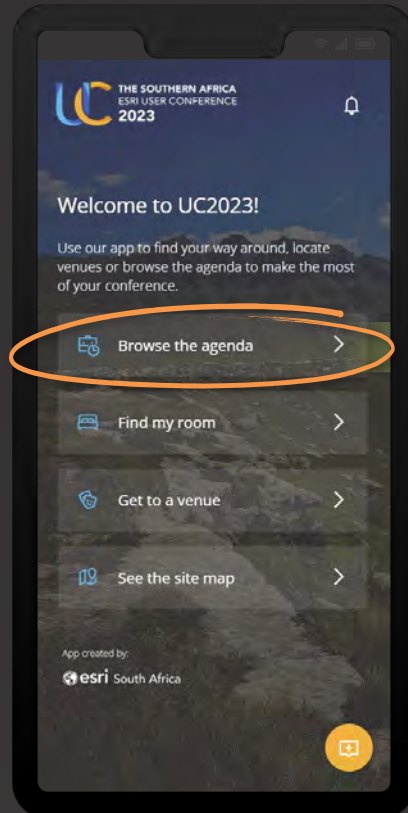


Open  
[uc2023.esri-southafrica.com](https://uc2023.esri-southafrica.com)  
and browse the agenda

Search and select the  
session you attended

Click the “thumbs up”  
icon

Complete and submit  
your review





**THE SOUTHERN AFRICA  
ESRI USER CONFERENCE  
2023**

**CONNECTING COMMUNITIES**