Working with Printing Service: Advanced Topics

JEFF MOULDS

TANU HOQUE

Session outline
Subhead Here

- **What** is printing service and **how** it works?
- Use **secured** services with printing service
- **ArcPy** based printing solutions

Why do we need a Printing Service?
Subhead Here

- Create a printable document (PDF, PNG etc.)
- Higher DPI
- Large format plot
- Map surrounds (title, scale bar, legends etc.)
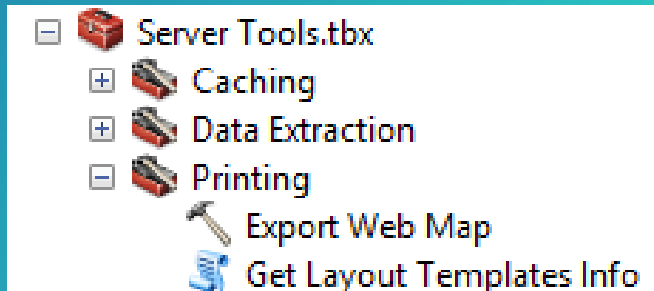
What is Printing Service?
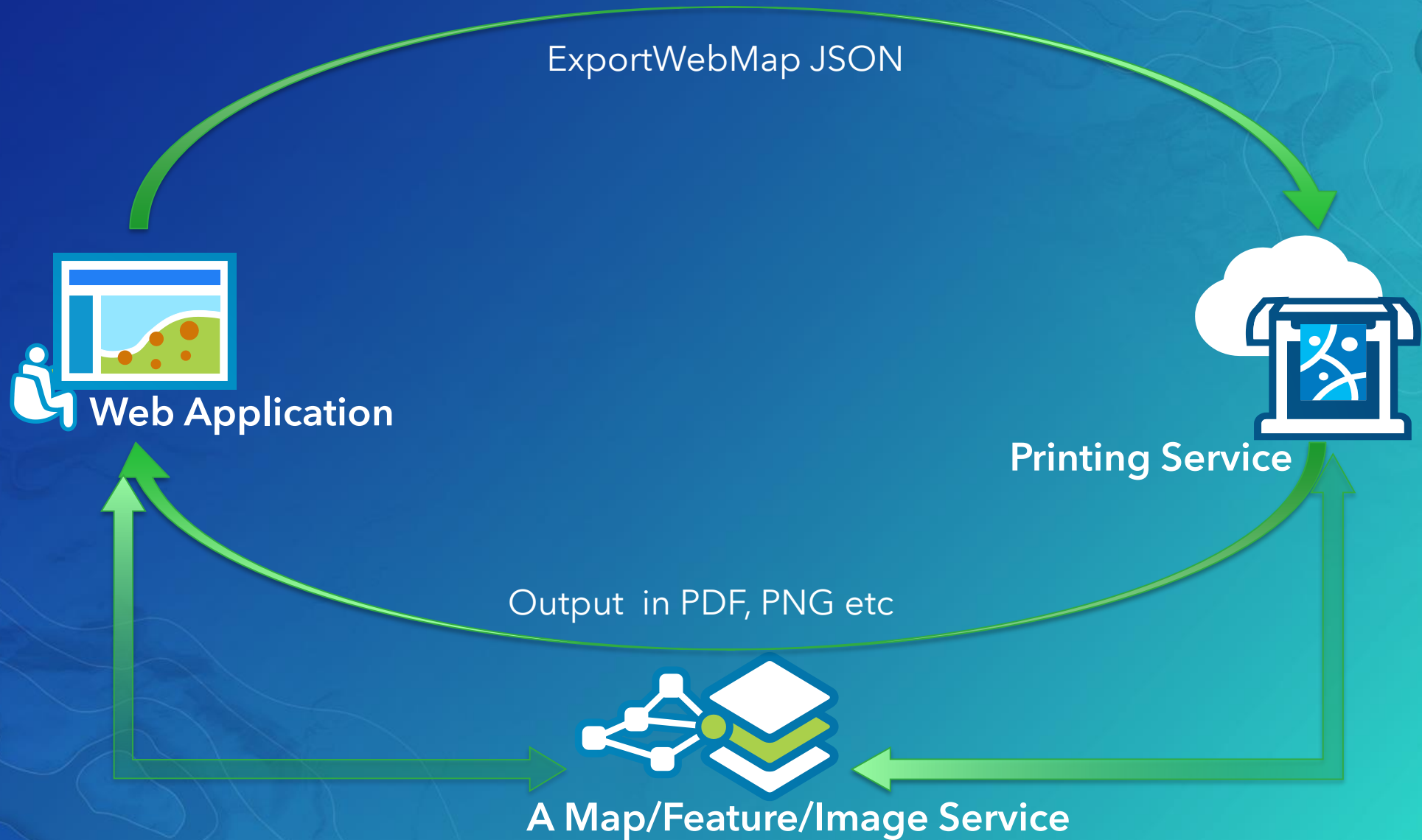
Where can I find one?

What?

- It is a Geoprocessing Service

Where?

- ArcGIS Online Printing Service

- Out of the box Printing Service comes with ArcGIS Enterprise install

- Your own printing service using Export Web Map tool
  - with your own templates

Printing Service – how does it work?

ExportWebMap JSON
Where can I find one?

description of the map

content of the map

description of the output

description of the layout

```json
1  {
2      "mapOptions": {
3          "extent": { },
4          "spatialReference": { },
5          "scale": 18489297.737236
6      },
7      "operationalLayers": [
8          {
9              "id": "World_Dark_Gray_Reference_8618",
10             "title": "World Dark Gray Reference",
11             "url": "http://services.arcgisonline.com/arcgis/re
12         }
13     ],
14     "exportOptions": {
15         "outputSize": [670, 500],
16         "dpi": 96
17     },
18     "layoutOptions": {
19         "titleText": "USA Census Map",
20         "scaleBarOptions": { },
21         "legendOptions": {
22             "operationalLayers": [{"id":"Census_3920"}]
23         }
24     }
25  }
```

Security

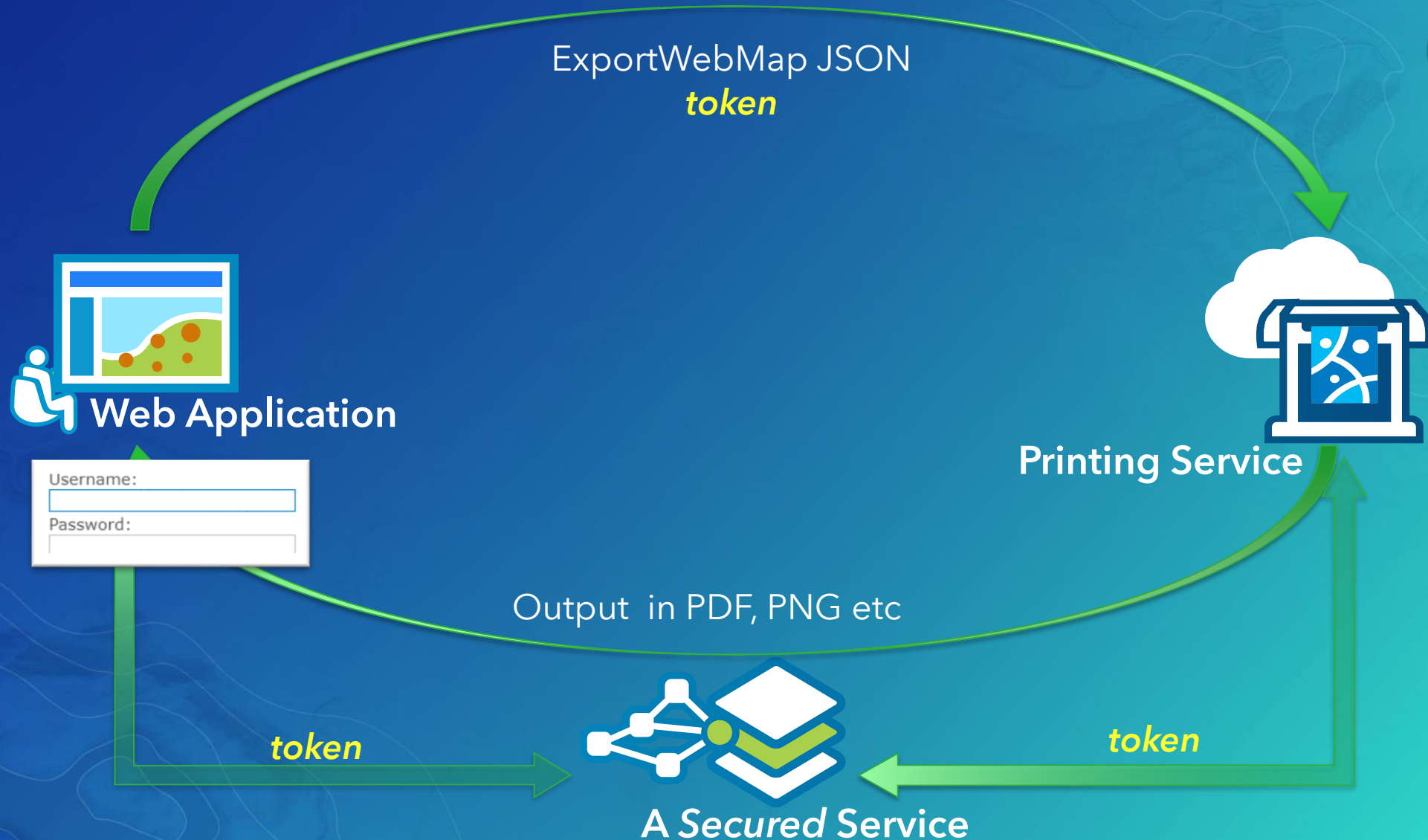Print web map containing secured services

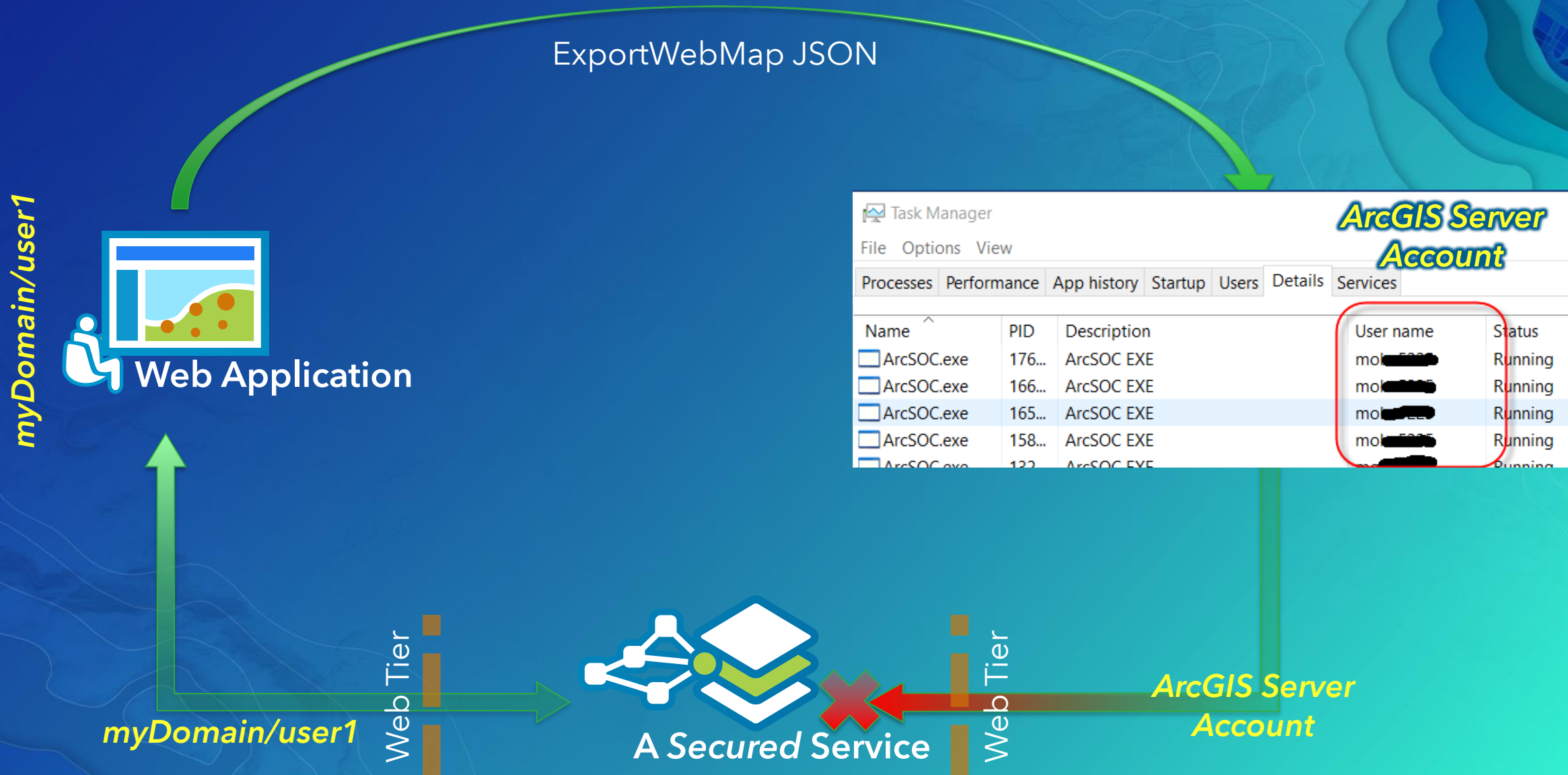# Can I Use Secured Services with Printing Service?
Where can I find one?

- Secured Services are supported
    - Short term **token** (optionally with **referrer**)

- **Web tier level** security supported when server is **federated** to a portal
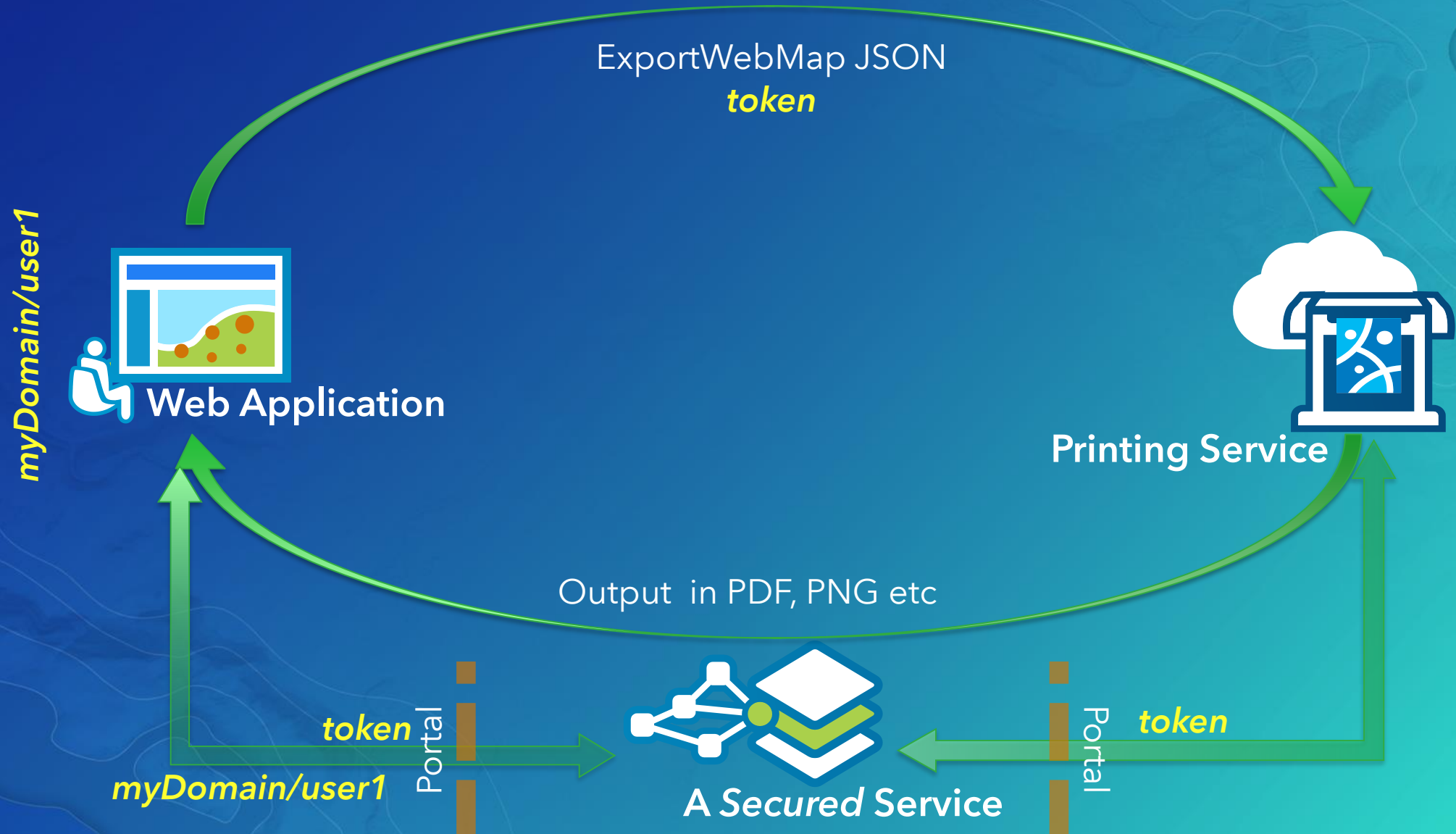   - e.g. Windows Integrated Authentication

Printing Service – how does it work with secured services?

ExportWebMap JSON
token

Web Application

Username:

Password:

Output in PDF, PNG etc

Printing Service

token

token

A *Secured* Service

Printing Service – Web Tier Security

ExportWebMap JSON

myDomain/user1

Web Application

ArcGIS Server Account

Task Manager

File   Options   View

| Processes | Performance | App history | Startup | Users | Details | Services |

Name	PID	Description	User name	Status
ArcSOC.exe	176...	ArcSOC EXE	mo▮▮▮▮	Running
ArcSOC.exe	166...	ArcSOC EXE	mo▮▮▮▮	Running
ArcSOC.exe	165...	ArcSOC EXE	mo▮▮▮▮	Running
ArcSOC.exe	158...	ArcSOC EXE	mo▮▮▮▮	Running
ArcSOC.exe	132...	ArcSOC EXE	mo▮▮▮▮	Running

myDomain/user1

Web Tier

A Secured Service

Web Tier

ArcGIS Server Account

Printing Service – Web Tier Security and Portal

ExportWebMap JSON
token

myDomain/user1

Web Application

Printing Service

Output in PDF, PNG etc

token
Portal

myDomain/user1
Portal

token
Portal

A *Secured* Service

# ArcPy based Printing Service

Jeff Moulds

Advanced server printing with arcpy.mapping

- **Full capabilities of arcpy.mapping:**
  - Swap out service layers for local vector data for *vector PDF output*
  - Export using advanced options
  - Export data driven pages
  - Export to PDF and insert additional pages (title page, reports, etc.)
  - Controlling the appearance of the legend
  - Etc.
- **Return a printer-friendly output file (PDF, PNG, etc.)**

Advanced server printing with arcpy.mapping

- **Build web apps with customized versions of the out-of-the-box print service**

Web API / Web AppBuilder

arcpy.mapping.
ConvertWebMapToMapDocument

High-quality vector output (e.g. PDF)
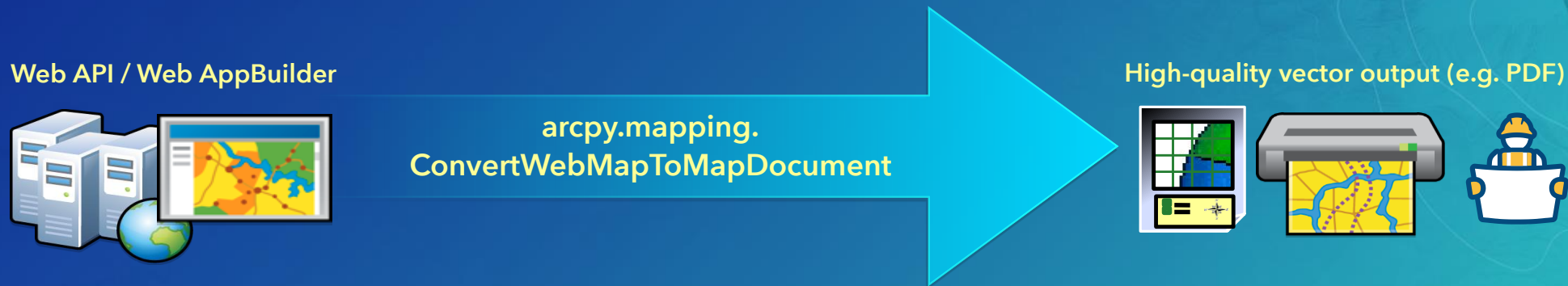
- **Arcpy.mapping method for converting Web Maps to Map Documents:**
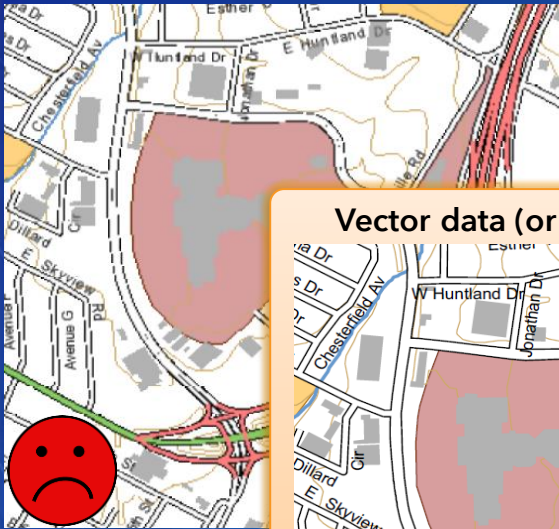 - `ConvertWebMapToMapDocument (webmap_json, {template_mxd}, {notes_gdb}, {extra_conversion_options})`

Online help and examples   http://esriurl.com/4600
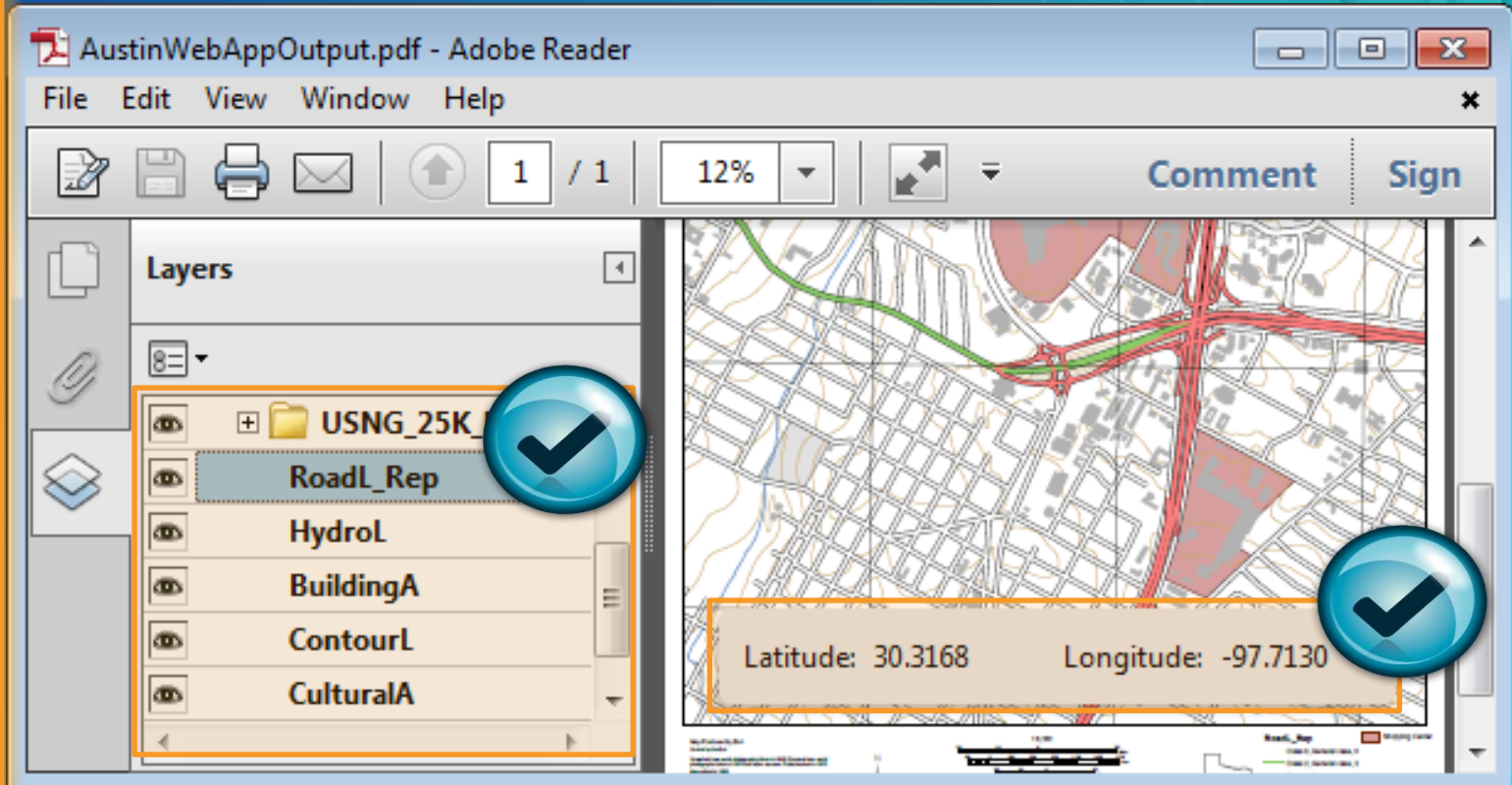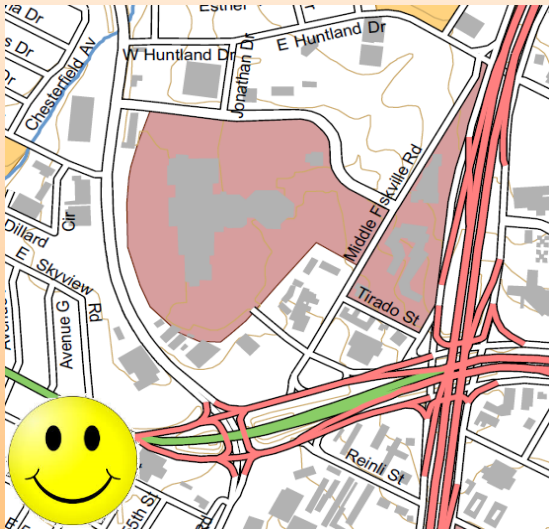
Demo: Web app to export vector PDF using arcpy.mapping

- **Reference the arcpy.mapping GP service in JavaScript API**
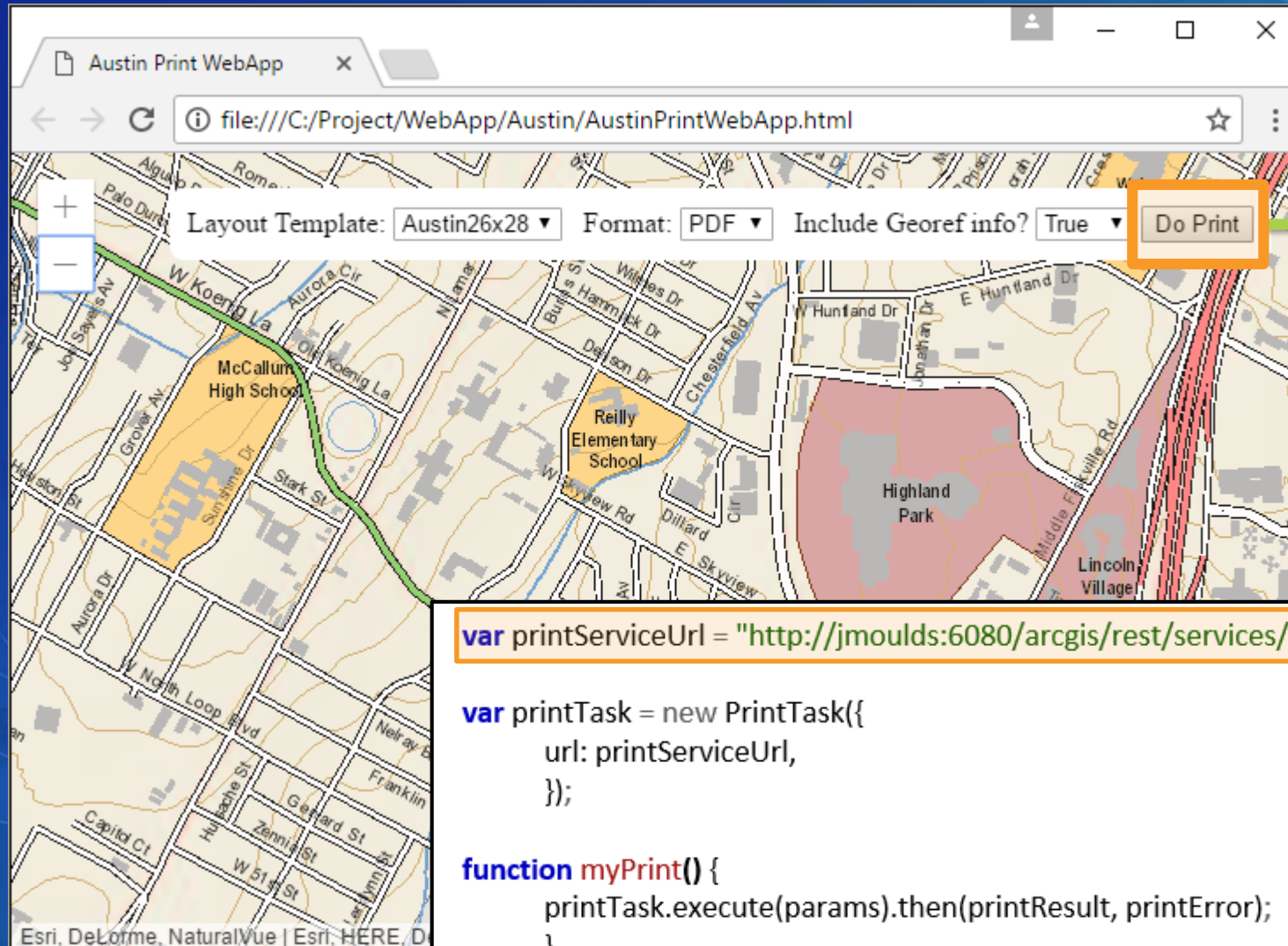

```javascript
var printServiceUrl = "http://jmoulds:6080/arcgis/rest/services/Austin/AustinPrint/GPServer/AustinPrint";

var printTask = new PrintTask({
        url: printServiceUrl,
        });

function myPrint() {
        printTask.execute(params).then(printResult, printError);
        }
```

Demo: Web app to export vector PDF using arcpy.mapping

Python code used in custom GP service

Get web map JSON

Get output format (e.g. PDF)

Get template MXD

Get extra parameter (Georeferencing Info)

Create new MXD based on web map

Remove service layers

Export to PDF or PNG

Output file of job

```python
1    # Parameter 0: Input WebMap json
2    Web_Map_as_JSON = arcpy.GetParameterAsText(0)
3
4    # Parameter 1: Format for output
5    Format = arcpy.GetParameterAsText(1)
6
7    # Parameter 2: Input Layout template
8    Layout_Template = arcpy.GetParameterAsText(2)
9    dataStorePath = u'//jmoulds/Austin/Templates'
10   templateMxd = os.path.join(dataStorePath, Layout_Template + '.mxd')
11
12   # Extra parameter 3: Georeferencing boolean
13   Georef_info = arcpy.GetParameterAsText(3)
14
15   # Convert the WebMap to a map document
16   result = arcpy.mapping.ConvertWebMapToMapDocument(Web_Map_as_JSON, templateMxd)
17   mxd = result.mapDocument
18   df = arcpy.mapping.ListDataFrames(mxd, 'Webmap')[0]
19
20   # Remove the service layer
21   # This will just leave the vector layers from the template
22   for lyr in arcpy.mapping.ListLayers(mxd, data_frame=df):
23       if lyr.isServiceLayer:
24           arcpy.mapping.RemoveLayer(df, lyr)
25
26   # Use the uuid module to generate a GUID as part of the output name
27   output = 'WebMap_{}.{}'.format(str(uuid.uuid1()), Format)
28   Output_File = os.path.join(arcpy.env.scratchFolder, output)
29
30   # Export the WebMap
31   if Format.lower() == 'pdf':
32       arcpy.mapping.ExportToPDF(mxd, Output_File, georef_info=Georef_info_bol)
33   elif Format.lower() == 'png':
34       arcpy.mapping.ExportToPNG(mxd, Output_File, transparent_color='255, 255, 255')
35
36   # Set the output parameter to be the output file of the server job
37   arcpy.SetParameterAsText(4, Output_File)
```
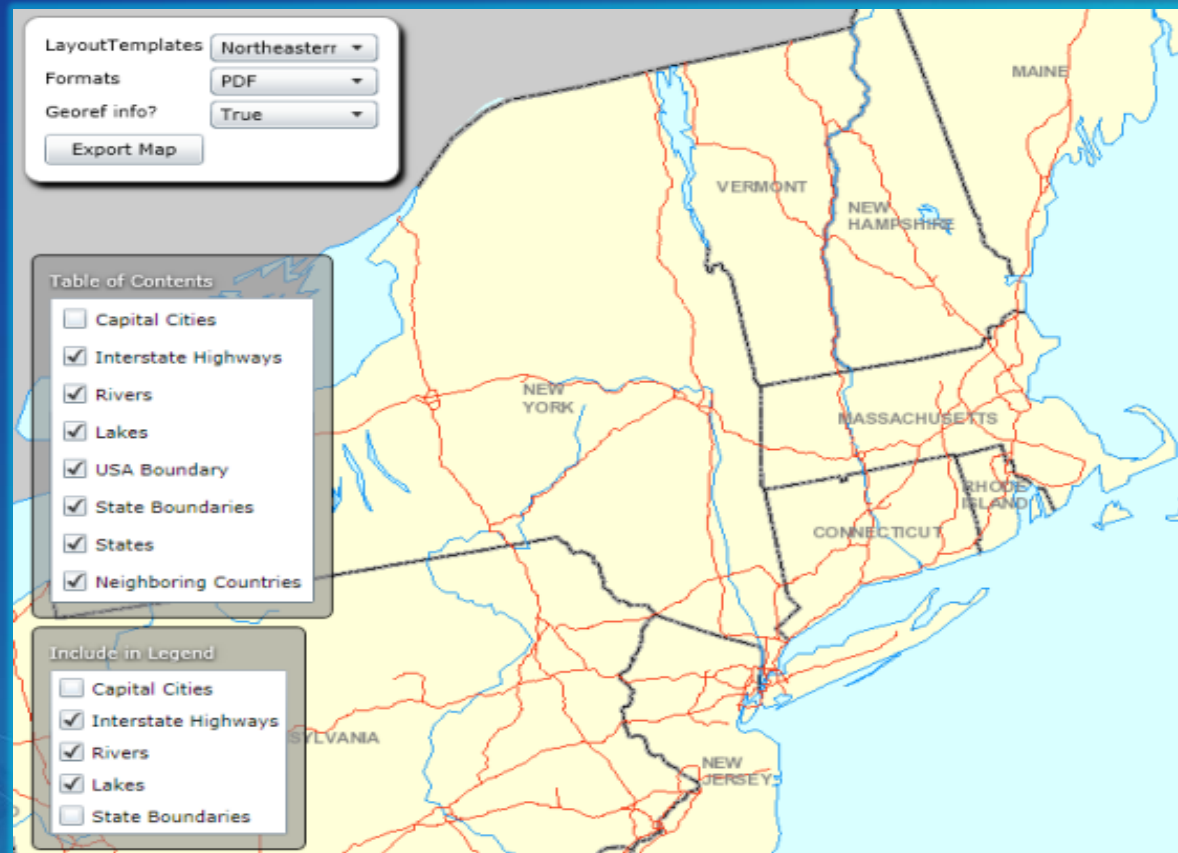
Web app to export vector PDF using arcpy.mapping

- **Two tutorials in the help:**
  - Basic vector web map printing: http://esriurl.com/4601
  - Advanced web map printing: http://esriurl.com/4602

ArcPy – how to add a photo with my parcel map?

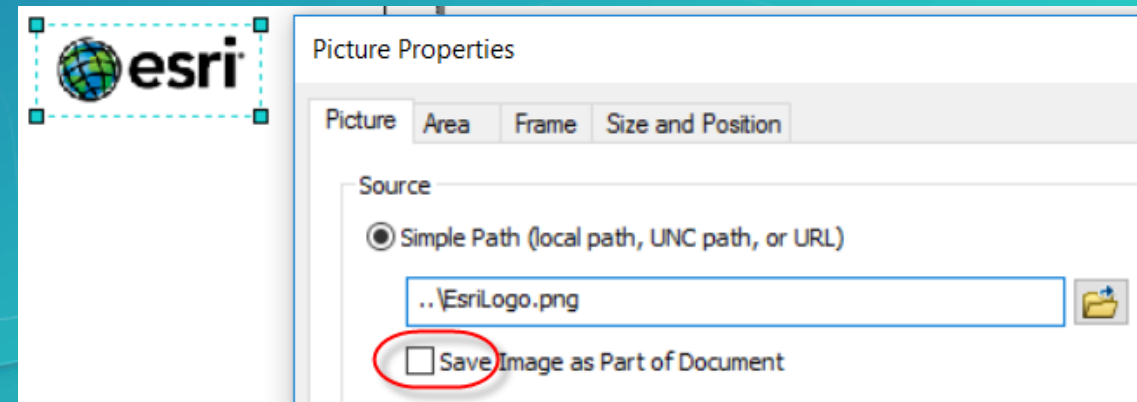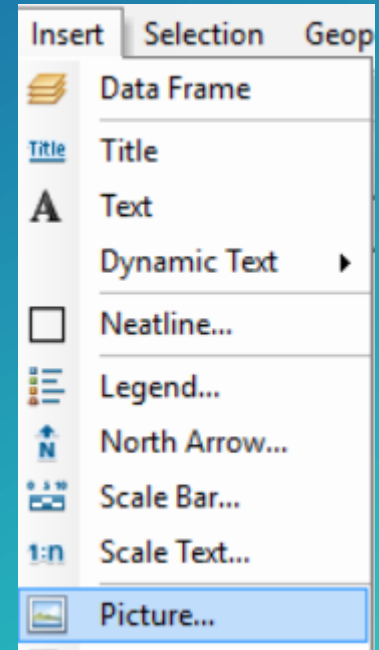- Author the layout template with a picture element
  - Insert a Picture Element
  - Do not save it as part of the document
- Update its source using arcpy function

```
#get a reference to the first picture element on the layout
pictElm = arcpy.mapping.ListLayoutElements(m, "PICTURE_ELEMENT")[0]

#updating the source image of the picture elment
pictElm.sourceImage = r"E:\MyPhotos\parcel_photo.jpg"
```

ArcPy – Access Feature Attributes from a ExportWebMap JSON?

Python code

```python
import json
js = json.loads(ExportWebMap_as_JSON)
olyrs = js["operationalLayers"]
ol = olyrs[2]
fcol = ol["featureCollection"]
lyrs = fcol["layers"]
lyr = lyrs[0]
fset = lyr["featureSet"]
fs = fset["features"]
f = fs[0]
attr = f["attributes"]
print attr["STATE_NAME"]
```

Structure of featureCollection in a ExportWebMap JSON

```json
"operationalLayers": [
  {...},
  {...},
  {
    "id": "displayLayer_of_Census_3920_3",
    "featureCollection": {
      "layers": [
        {
          "layerDefinition": {
            "name": "polygonLayer",
            "geometryType": "esriGeometryPolygon"
          },
          "featureSet": {
            "geometryType": "esriGeometryPolygon",
            "features": [{
              "geometry": { ... },
              "attributes": {
                "OBJECTID": 39,
                "STATE_NAME": "North Carolina",
                "STATE_FIPS": "37",
```

ArcPy based Printing Service to Print Popups

- Client App to pass in popup information (aka feature attributes) in featureCollection
  - e.g. you can use "Select" widget in a Web Application Builder app to select and highlight features
    - that gets passed featureCollection layer in the ExportWebMap_as_Json to a printing service
- ArcPy code reads those attributes
  - and update the value, of an existing 'Text Element' on a layout template
- Blog post: **http://esriurl.com/12303**

ArcPy – helps with debugging

- Extract ExportWebMap_as_JSON using web browser's developer tool

- Convert that to MXD using arcpy functions n ArcMap's Python window

  - `result = arcpy.mapping.ConvertWebMapToMapDocument(exportWebMap_json)`

  - `print result.mapDocument.filePath`

  Note: pass in a path of a FileGeodatabase as a value for {notes_gdb} parameter, if your webmap contains featureCollections (aka client sider graphic layers)

- Open the map document in ArcMap
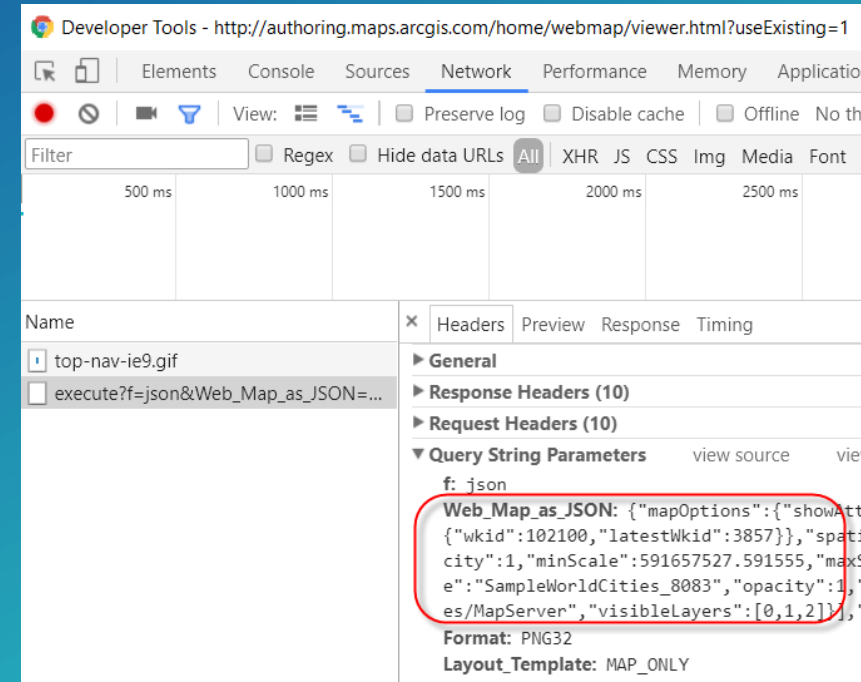
Summary
Subhead Here

- Printing service is a **Geoprocessing** service
  - ArcGIS Online's printing service
  - Printing service comes with ArcGIS Enterprise install
  - Your own printing service
- Printing service only support **token** based security
  - ArcGIS Server needs to be federated with a port for web tier level security
- **ArcPy** based printing solutions
  - Create and publish a printing service based on arcpy script
  - Output containing vector features
  - Adding parcel photos
  - Popup printing
  - Debug

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Esri User Conference
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ALL EVENTS

Schedule

JULY   SUN   MON   TUE   WED   THU
         9   10   11   12   13

8:30 AM - 9:45 AM
ArcGIS Pro: Mapping and Visualization
SDCC - Ballroom 06 F

8:30 AM - 9:45 AM
ArcPad - An Introduction
SDCC - Room 32 A

8:30 AM - 9:45 AM
Building Your Indoor GIS: CAD and BIM Import
SDCC - Room 16 B

Filter On

ArcPad - An Introduction
SDCC - Room 32 A

Add Reminder

TIME

Jul 11, 8:30 AM - 9:45 AM

SDCC - Room 32 A
SDCC

DESCRIPTION

This session will provide an overview of ArcPad, Esri's software for mobile GIS and field mapping, with an emphasis on the new

ArcPad - An Introdu...

FEEDBACK

Title and Description Consistent with Content

Low (1)—(2)—(3)—(4)—(5) High

Well Organized/Clear Presentation

Low (1)—(2)—(3)—(4)—(5) High

Public Speaking Skills

Low (1)—(2)—(3)—(4)—(5) High

The content of the workshop was relevant to my work

No   Yes

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