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ArcGIS for Server Administration API for C# Developers

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Content

- What is the REST admin API all about?
- Why script it- and why script it using C#?
- How to do it!

What is the ArcGIS for Server REST Admin API

- RESTful interface for administering ArcGIS for Server
- Similar to the regular REST API used by the client SDKs and APIs
- Used by Manager and ArcGIS for Desktop when publishing or managing ArcGIS for Server

Why not just use Manager?

- Automating repetitive tasks
- Consistency in deployment
- Performing tasks not easily possible in Manager
- Automated monitoring
- The sky is the limit..

Why use C#?

- You could use any scripting or programming language capable of making HTTP GET and POST requests
- C# is widely used by many organizations and may be best fit for existing processes, install scripts, etc.
- Lots of other options: Python, Javascript, Java, Ruby, ..

Setup

- Visual Studio 2010 SP1, Visual Studio 2012, or Visual Studio 2013
- Install NuGet (or update VS2012/VS2013 built-in to latest)

- In your C# project:
  - Install-Package Newtonsoft.Json

- I’m using System.Net.Http from .NET Framework 4.5

My software for the presentation

- Visual Studio 2013
- NuGet
- Json.NET (aka. Newtonsoft.Json)
- Fiddler

The API doc

- ArcGIS Server Administrator API for 10.2 documentation: http://esriurl.com/agsadmin102

- One stop shop for resources, operations, and samples including JSON spec.

First things first: get a token

- At ArcGIS for Server 10.1-10.2 all administrative requests must be authenticated with an administrative token

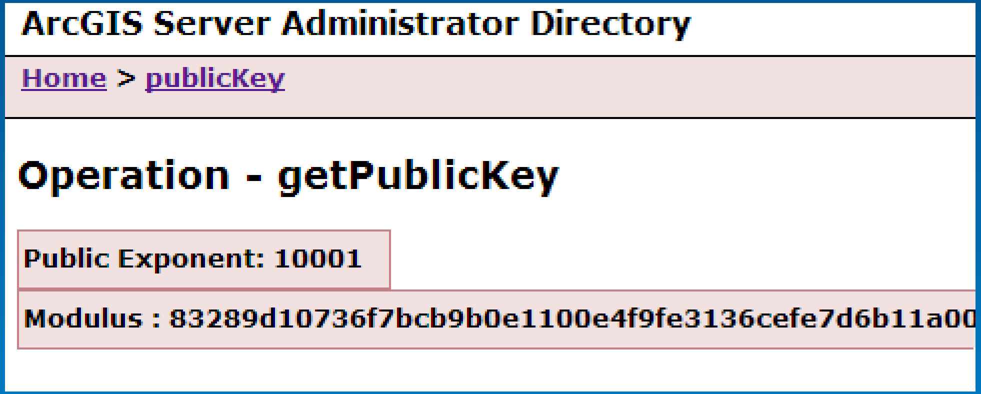
- /arcgis/admin/generateToken operation
  - Username
  - Password
  - Client
  - Encrypted
  - Other parameters depending on Client value

  - **Pro tip**: when encrypted=true then *all* parameters other than *f* have to be encrypted!

Securely sending sensitive data.. like your password

BEST SECURITY COMES FROM USING SSL ON SERVER WITH HIGH STRENGTH CERTIFICATE!

- /arcgis/admin/publicKey resource exposes 512-bit RSA key



ArcGIS Server Administrator Directory

Home > publicKey

Operation - getPublicKey

Public Exponent: 10001

Modulus : 83289d10736f7bcb9b0e1100e4f9fe3136cefe7d6b11a00

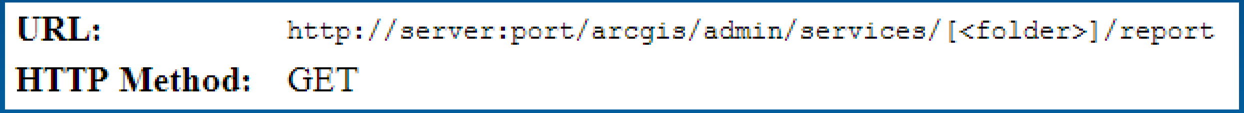
- RSA encryption details not (yet) in the documentation:
  - PKCS#1 v1.5 padding
  - UTF8 byte encoding of strings
  - Hex encoding of bytes

Sending an HTTP request

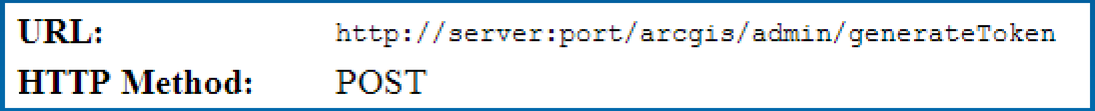
- .NET Framework 4.5 introduced System.Net.Http.HttpClient
  - Package from Microsoft adds HttpClient support to .NET Framework 4.0, Silverlight 4, Silverlight 5, Windows Phone 7.5, and Windows Phone 8: http://nuget.org/packages/Microsoft.Net.Http
- Much simpler interface than classic HttpWebRequest or WebClient
- If working on older platform just use a different way to put together data and request

Putting together HTTP request data

- Identify whether resource or operation is designed for GET or POST



URL:	`http://server:port/arcgis/admin/services/[<folder>]/report`
HTTP Method:	GET



URL:	`http://server:port/arcgis/admin/generateToken`
HTTP Method:	POST

- For GET requests parameters go in the query string
- For POST requests the data goes in the HTTP body

Encoding query string values for GET requests

- `System.Web.HttpUtility.ParseQueryString`
- Useful class for ensuring proper encoding of special characters and doing string manipulation for you.
- One query string parameter you’ll always add: f=json

Creating HTTP body for POST requests

- `System.Net.Http.FormUrlEncodedContent`
- **Part of HttpClient helper classes. Takes care of encoding POST data in the format used by the ArcGIS Admin API.**

  (exception: uploads/upload operation uses Multipart format)

- `IEnumerable<KeyValuePair<string, string>> data = …;`
- `var content = new FormUrlEncodedContent(data);`
- **Hint: Dictionary<string, string> is an IEnumerable<KeyValuePair<string, string>>**

Parsing data: dealing with JSON

- Json.NET (aka. Newtonsoft.Json) is widely used in the .NET community
- Open source (MIT license)
- Fast and flexible

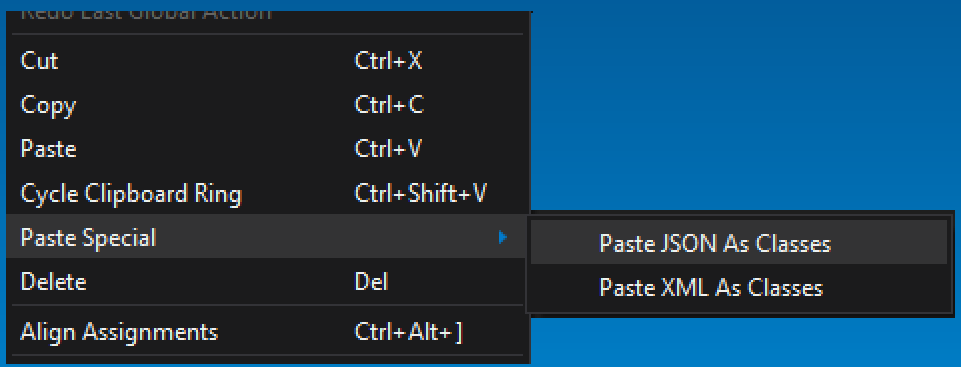
Option 1: DOM-style parsing

- `JObject result =`
  ```
  Newtonsoft.Json.Linq.JObject.Parse(str);
  ```
- **Full LINQ capabilities as well as simply reading individual properties.**
- `string attributeValue =`
  ```
  result["attributeName"].Value<string>()
  ```
- **Great for one-off development.**

Option 2: serializing to/from classes

- **Create POCO classes: plain .NET classes that map to the JSON**

- **Visual Studio 2012 Update 2 and Visual Studio 2013 simplify task immensely with *Paste JSON As Classes* option**



- **Touch up generated classes with enums, number types etc.**

Encoding conventions

- Raw byte arrays are hex encoded (used for encrypted data)
- Timestamps are represented as *milliseconds* since Unix epoch (1970-01-01).

Steps to interacting with REST Admin API

- 1. Get an administrative token
- 2. Identify input parameters and request type
- 3. Create data and send request
- 4. Parse response
  - Identify error conditions if any

Building a working sample

- Goal: create a WPF watchdog application that shows service status (running or stopped)
- Steps:
  - Authenticate
  - Get list of folders
  - Get list of services and their status in each folder
- Demo time!

Building a working sample

- Goal: publish a service based on a pre-created .SD file

- Steps:
  - Authenticate
  - Upload .SD file to server
  - Create Service based on uploaded file and service properties

- Demo time!

Getting the samples

- All code for the samples is available on GitHub:
- https://github.com/pheede/agsadmin-devsummit

Questions?

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Understanding our world.