Automating ArcGIS for Server Configurations using Chef and the Admin API

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Agenda

• Why Web GIS Automation
• Chef and Web GIS Automation
• Getting Started with a Sample using Chef and the Admin API
• Deployment Options
• Define Your Own Web GIS Deployment Configurations
• Upgrading a Distributed Deployment using Chef Server
• Chef Web GIS Automation Tips
What is DevOps?

- Software development method that stresses communication, collaboration (information sharing and web service usage), integration, automation and measurement cooperation between software developers and other information-technology (IT) professionals.
- Organizations are looking to automate and become more efficient at administration
- Reliable deployments and upgrades (DEV $\rightarrow$ TEST $\rightarrow$ PROD)
Why Web GIS automation
This...
Quickly turns into this..
Business critical deployments

- Reliable infrastructure
  - Repeatable
  - Testable

- Fast Disaster Recovery

- Moving between data centers
Cloud Environments

- Quick configuration with Disposable machines
- Rapid Auto-Scaling
- Simplifies moving VMs between data centers
Everybody

✓ Simplifies deployment and upgrade procedures
✓ Focus more on GIS tasks
✓ Prepares for larger scale and clouds
✓ From Esri: Ready-to-use tools with minimum requirements to start
Chef and Web GIS Automation
Chef

- Chef platform consists of open source and commercial products that automate infrastructure, applications, compliance, and the DevOps workflow
- One of the fast growing IT automation platforms
- Supported on Windows and Linux
- Open source (Ruby based)
Some Chef Components

- Cookbook - defines a scenario and contains recipes required to support an installation/configuration scenario.
  - Recipe - defines everything required to configure a particular part of a system.
    - Attribute – defines individual parameters to use during an installation/configuration; used to override the default installation settings.

- Chef-server vs client
Esri and Chef

- Esri develops and releases via GitHub Chef cookbooks that can be used for automation, deployments, and DevOp scenarios.  

Supported ArcGIS Software

- ArcGIS Server
- ArcGIS Data Store
- Portal for ArcGIS
- ArcGIS Web Adaptor
- And other Esri Software:
  - ArcGIS Pro
  - ArcGIS Desktop
  - ArcGIS License Manager
  - ArcGIS GeoEvent Extension for Server
Tested platforms

- Windows 7, 8.1, 10
- Windows Server 2008 and Windows Server 2008 R2
- Windows Server 2012 and Windows Server 2012 R2
- RHEL 6.5
- RHEL 7.0
- Ubuntu LTS 14.04 (when deploying ArcGIS for Server on Amazon Web Services)
How do I get started with Esri provided Cookbooks?

Install ArcGIS Server on a local Windows server

2. Extract to local workstation, e.g. D:\chef.
3. Install Chef client from https://downloads.chef.io/chef-client/
4. Edit a cookbook JSON file you are interested in running, e.g. D:chef\roles\arcgis-server-windows.json
5. Run chef cookbook: "chef-client -z -j D:\chef\roles\arcgis-server-windows.json"

Creating Attributes JSON file to run Cookbook

Install ArcGIS Server on a local Windows server

```json
{
  "arcgis": {
    "run_as_password": "Run_As_Pa$$w0rd",
    "run_as_user": "arcgis",
    "version": "10.4.1",
    "server": {
      "admin_username": "admin",
      "admin_password": "changeit",
      "keystore_file": "C:\keystore\mydomain_com.pfx",
      "keystore_password": "changeit",
      "directories_root": "C:\arcgisserver",
      "setup": "C:\ArcGIS\10.4.1\ArcGIS_Server\Setup.exe",
      "authorization_file": "C:\ArcGIS\10.4.1\Authorization_Files\Server_Ent_Adv.prvc"
    }
  },
  "run_list": [
    "recipe[arcgis-server::system]",
    "recipe[arcgis-server::server]"
  ]
}
```
ArcGIS for Server and Map Services Deployment using Chef and Admin API
What did Chef just do?

- **ArcGIS Server:**
  - Install
  - Authorize
  - Create site based on parameters
  - Published 2 Map Services from SD files
  - Published additional 2 Map Services from SD files

- **Why would you want to use Chef to publish Map Services?**
  - Mass publication of staged Service Definition files
  - Auto-scaling environment
  - Disaster Recovery scenarios
Web GIS Deployment Options
Multi-Machine Server GIS
All-In-One Web GIS Deployment

• What chef does:

1. **Uninstall and cleanup your machine if needed.**
2. **ArcGIS Server: Install; Authorize; Create site.**
3. **WA: Install; Configure to IIS; Configure for ArcGIS Server.**
4. **Data Store: Install; Register it with ArcGIS Server.**
5. **Portal for ArcGIS: Install; Authorize; Create Portal.**
6. **WA: Install; Configure for Portal.**
7. **Federate ArcGIS Server with Portal.**
8. **Set the ArcGIS Server as the hosting Server.**
Highly Available Web GIS Deployment on Two machines

- Two machines
- Highly Available Portal for ArcGIS
- Server Site architecture
- Highly Available ArcGIS Data Store
- File Server machine
Web GIS Software – All on Different Machines
Upgrade from Previous Version

- **10.4**
- **10.4.1**
Other ArcGIS Software

- License Manager
- ArcGIS Desktop
- ArcGIS Pro
Define Your Own Web GIS Deployment Configurations
ArcGIS Cookbook Recipes

- **system**: Ensures system requirements
- **all_installed**: Installs Server, Data Store, Portal, and Web Adaptors
- **iis**: Enables required IIS features and configures HTTPS binding
- **server**: Installs and configures ArcGIS Server
- **server_wa**: Installs Web Adaptor and configures it with ArcGIS Server
- **portal**: Installs and configures Portal for ArcGIS
- **portal_wa**: Installs Web Adaptor and configures it with Portal for ArcGIS
- **datastore**: Installs and configures ArcGIS Data Store
- **egdb**: Registers GeoDatabases with server
- **Federation_server**: Federates ArcGIS Server with Portal for ArcGIS
ArcGIS Cookbook Recipe

- **Recipe**
  - Attributes
  - Action

- **Property Settings: Attributes**

- **Run-list**
Define Your Own Properties

default['arcgis']['portal']['url'] = 'https:// + node['arcgis']['portal']['domain_name'] + ';
default['arcgis']['portal']['private_url'] = 'https://' + node['arcgis']['portal']['domain_name'] + ';
default['arcgis']['portal']['web_context_url'] = nil
default['arcgis']['portal']['admin_username'] = 'admin'
default['arcgis']['portal']['admin_password'] = 'changeit'
default['arcgis']['portal']['arcgis'] =
  "arcgis":{
    "run_as_password": "Run As Pa$$w0rd",
    "run_as_user": "arcgis",
    "version": "10.4",
    "portal":{
      "admin_username": "admin",
      "admin_password": "esri.agp",
      "admin_email": "admin@mydomain.com",
      "security_question": "Your favorite ice cream flavor?",
      "security_question_answer": "vanilla",
      "content_dir": "C:\\arcgisportal\\content",
      "setup": "\\\meteor\\Portal_for_ArcGIS10.4\\Setup.exe",
      "authorization_file": "\\\meteor\\released\\Authorization_Files\\\Ver",
      "web_adaptor":{
        "setup": "\\\meteor\\ArcGIS_WebAdaptorIIS10.4\\Setup.exe",
        "admin_access": true
      }
    }
  },
Define Your Own Run List

```json
{
  
  "run_list": [
    "recipe[arcgis::system]",
    "recipe[arcgis::iis]",
    "recipe[arcgis::server]",
    "recipe[arcgis::server_wa]",
    "recipe[arcgis::datastore]",
    "recipe[arcgis::portal]",
    "recipe[arcgis::portal_wa]",
    "recipe[arcgis::federation]"
  ],

  
  "run_list": [
    "recipe[arcgis-server::system]",
    "recipe[arcgis-server::server]",
    "recipe[arcgis-server::services]"
  ]
}
```
Distributed Deployment

- Login to every machine and run Chef-Client
- Chef-Server
  - Central repository
  - Assign roles to every machine
  - Run the recipes/updates accordingly
  - Setting up:
    - By yourself or
    - Hosted solution
Demo: Upgrade a Distributed Web GIS Deployment using Chef Server
Demo:

webgis-primary
10.4 → 10.4.1

webgis-secondary
10.4 → 10.4.1
Advanced Chef Deployment Options

- Take ready to use ArcGIS cookbooks
- Pick the recipes you need
- Combine with other community cookbooks
- Write new recipes
- Write your own cookbook
Disconnected Environment Considerations

- Make sure you have proper Esri license files staged for use
- ArcGIS installations in a common location for access
- Setting up your own Chef Server for distributed deployments
- Having Chef Client installation staged for installation
Key Point about Web GIS Chef Automation

- Automate Your Manual Work
- Work with other automation tools
- Doesn’t require programing skills
- Need up front investment
  - Design
  - Configuration
  - Testing
- Repeatable
  - Success in production environment
  - Smaller downtime in production
  - Faster recovery
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