Introductions

- **Who are we?**
  - We are CAD at ESRI
- **Who are you?**
  - .NET programmers
  - GIS professionals creating magic
  - Understand how to use CAD in Arc Map
  - Not AutoCAD programming wizards

Schedule

Please!
Turn OFF cell phones
and paging devices

- **Goals**
  - Inspire you to go farther

- **Today we will cover**
  - .NET with ArcGIS Geoprocessing in C#
  - Getting started with AutoCAD programming
  - .NET with AutoCAD
  - Accessing Geoprocessing from AutoCAD
  - Solutions to common CAD/GIS workflows

- **We will answer questions at the end**

Please complete the session survey!

Getting Ready: .NET Geoprocessing in ArcGIS
What you need to get started

- **What you DO NOT need:**
  - **Mastery of Arc Objects**

- **What you DO need:**
  - **ArcGIS 9.3 SP1 (+)**
  - **Visual Studio 2005 with .Net 2.0 Framework**
  - **Licensing: Server, Desktop, Engine**
  - **Understanding of Geoprocessing**
  - **Access to Samples**
    - **http://resources.esri.com/ArcgisServer/**
    - **http://resources.esri.com/CADdata/**

On Your Marks

Getting Ready: Mapping Specification for DWG
Your CAD/GIS Power Tool

- **What you might WANT:**

  A better way to organize CAD data
  webhelp.esri.com/arcgisdesktop/9.3/pdf/**Mapping_Specification_for_DWG**.pdf

  ArcGIS for AutoCAD
  - **User Interface for Mapping Specification**
  - **And more…**

.NET with ArcGIS Geoprocessing
Writing console applications using Geoprocessing Tools

- **Demo from Sample: ArcGIS GP Console**
  - Server Developer Help
  - http://resources.esri.com/arcgisserver/

```
Geoprocessor gp = new Geoprocessor();
ESRI.ArcGIS.ConversionTools.ExportCAD ec =
        new ESRI.ArcGIS.ConversionTools.ExportCAD();
ec.in_features = @"C:\Data\USA_Data.gdb\states";
ec.Output_Type = "DWG_R2007";
ec.Output_File = @"C:\Data\Output\Output.DWG";
ec.Seed_File = @"C:\Data\defaultSeed.dwg";

gp.OverwriteOutput = true;
gp.Execute(exportCad, null);
```

Get Set

Today we will cover

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Next: Getting started in AutoCAD programming

.NET in AutoCAD
What you need to get started

- **Version of AutoCAD with .Net 2.0**
  - **2007, 2008, 2009**
  - **Map 3d, Civil 3d, etc**
- **Microsoft Visual Studio 2005, Service Pack 1**

- **Download ObjectARX SDK from**
  www.autodesk.com/developautocad

- **Introduction to AutoCAD .NET Programming**
  - Video tutorial
  –

Closing Statement… (16 point yellow italic)

ObjectARX SDK – Which to Use?

API Version	2007	2008	2008 64-bit	2009	2009 64-bit	2010
ObjectARX 2007	Yes	Yes	No	Yes	No	No
ObjectARX 2008	No	Yes	No	Yes	No	No
ObjectARX 2008 64 bit	No	No	Yes	No?	Yes	No
ObjectARX 2009	No	No	No	Yes	Yes	No
ObjectARX 2010*	No	No	No	No	No	Yes

AutoCAD .NET : Hello, World
A first program in AutoCAD

- **ObjectARX Wizard**
- **Prototype: SendStringToExecute**
- **NetLoad for Managed Applications**

```
CommandMethod("HelloWorld")]
static public void HelloCommand()
{
    SendStringToExecute(
      "(command \"_text\" '(10.0 10.0 0.0)
      200 0 \"Hello, World\")",
      false, false, false);
}
```

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Next: Putting it all together

AutoCAD .NET : Hello, ArcGIS!
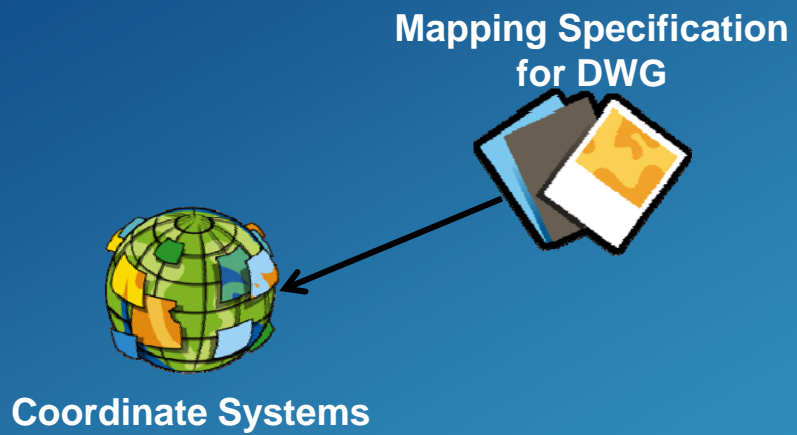*Putting it all together*

- ## Insert into current file

```
CommandMethod("HelloArcGIS")]
static public void GrabCommand()
{
    Geoprocessor gp = new Geoprocessor();
    ESRI.ArcGIS.ConversionTools.ExportCAD ec =
        new ESRI.ArcGIS.ConversionTools.ExportCAD();
    ec.in_features = @"C:\Data\USA_Data.gdb\states";
    ec.Output_Type = "DWG_R2007";
    ec.Output_File = @"C:\Data\Output\Output.DWG";
    ec.Seed_File = @"C:\Data\defaultSeed.dwg";

    gp.OverwriteOutput = true;
    gp.Execute(ec, null);
    InsertFile(ec.Output_File);
}
```

Programming in AutoCAD...a first step

Adding Coordinate Systems to AutoCAD

ArcGIS for AutoCAD

Mapping Specification for DWG

Coordinate Systems

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- **Solutions to common CAD/GIS workflows**
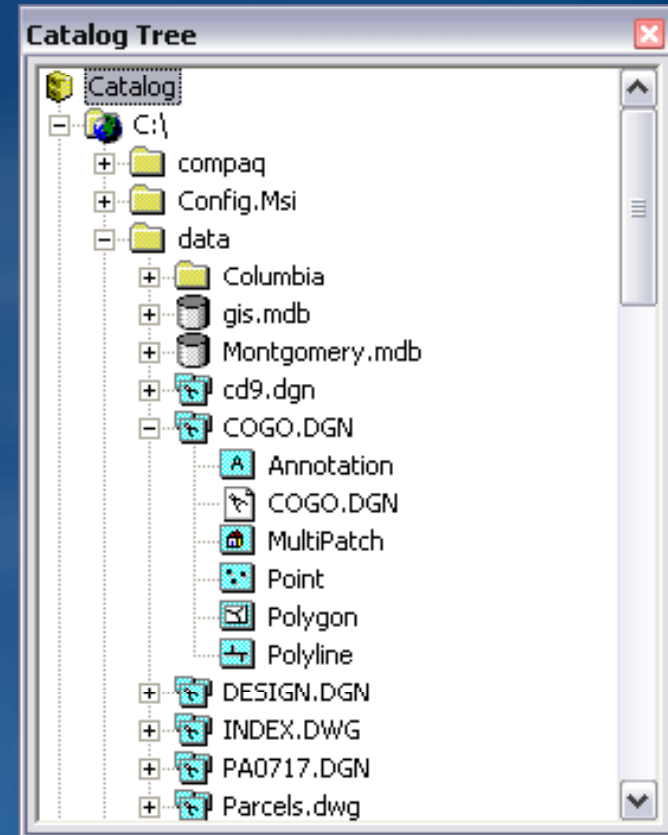
Common CAD Integration Workflows

- **Viewing CAD in Maps**
  - ArcMap

- **Pulling GIS data into CAD**
  - ExportCAD

- **Pushing CAD into GIS**
  - Data Cleanup

- **Using CAD in GIS Analysis**

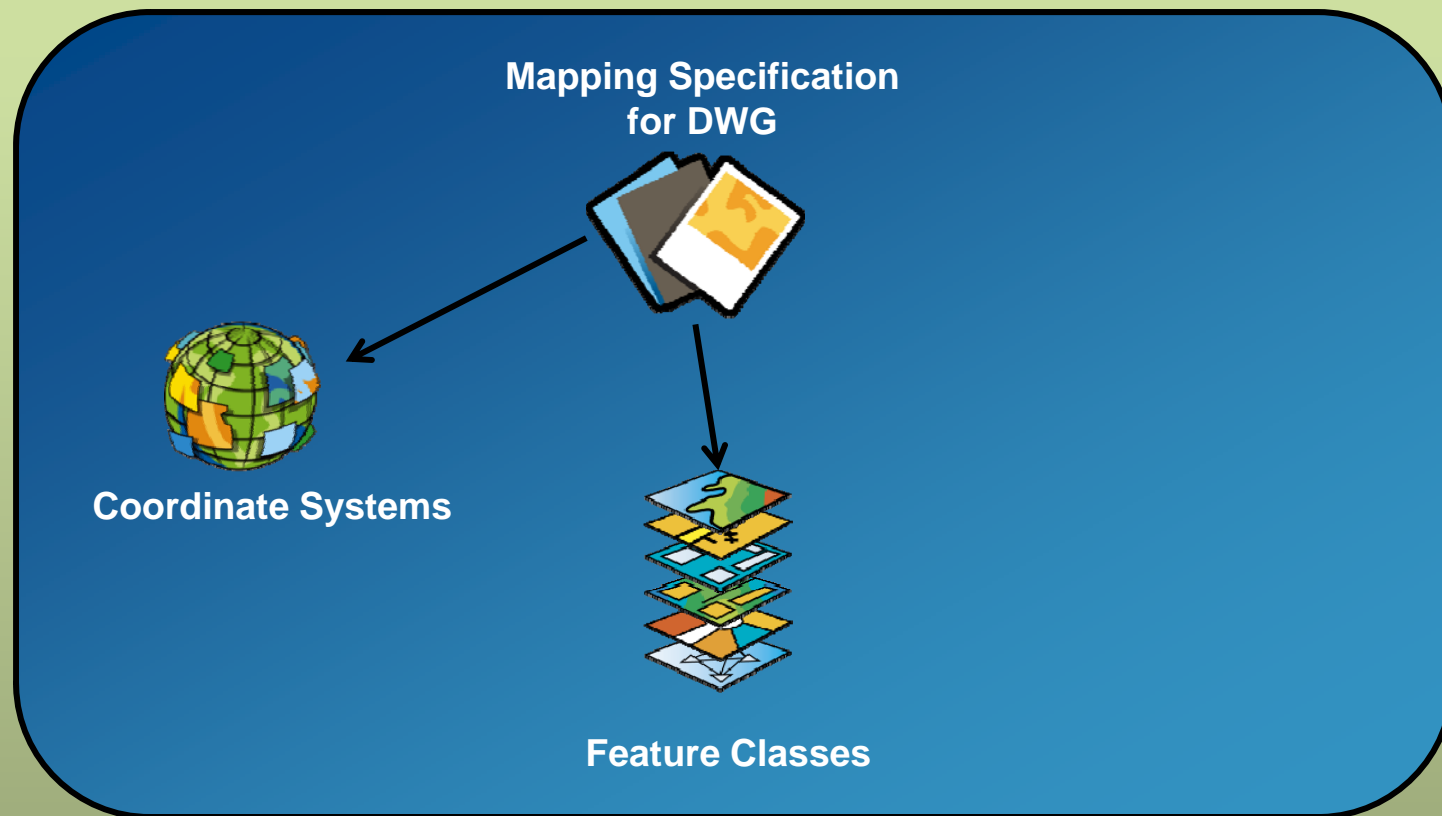# Data Loading from CAD
Understanding the requirements

- **Understand the goal**
  - Load just the new parcels

- **Understand the problem**
  - Parcels = Polygon
  - Filtering data

- **Evaluate possible solutions**
  - MakeLayer?

How can you organize CAD data better?

Feature Class Organization in AutoCAD

ArcGIS for AutoCAD

**Mapping Specification
for DWG**

Coordinate Systems

Feature Classes

Demo: Data Loading Workflow
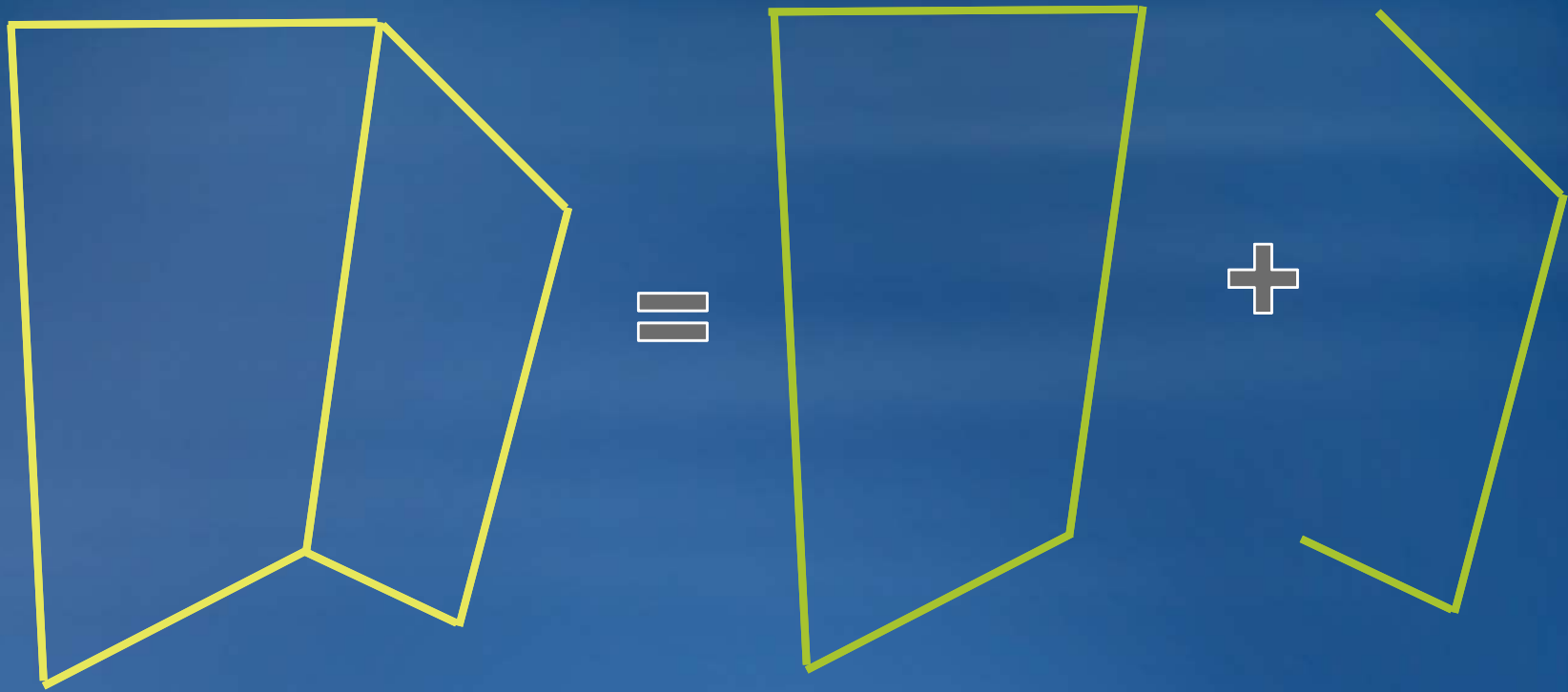*Prototyping a solution*

- **Geoprocessing options for loading data**

```
CommandMethod("CADToGIS")]
static public void LoadCommand()
{
    Geoprocessor gp = new Geoprocessor();
    ESRI.ArcGIS.ConversionTools.ExportCAD cf =
        new ESRI.ArcGIS.DataManagement.CopyFeatures();
    cf.in_features =   @"C:\Data\Cad.DWG\Parcels";;
    cf.output_features = @"C:\Data\maury.gdb\parcels"

    gp.OverwriteOutput = true;
    gp.Execute(cf, null);
}
```

Closing Statement… (16 point yellow italic)

Understanding your Data
When doing it wrong is the right thing to do

= +

Polyline != Parcels
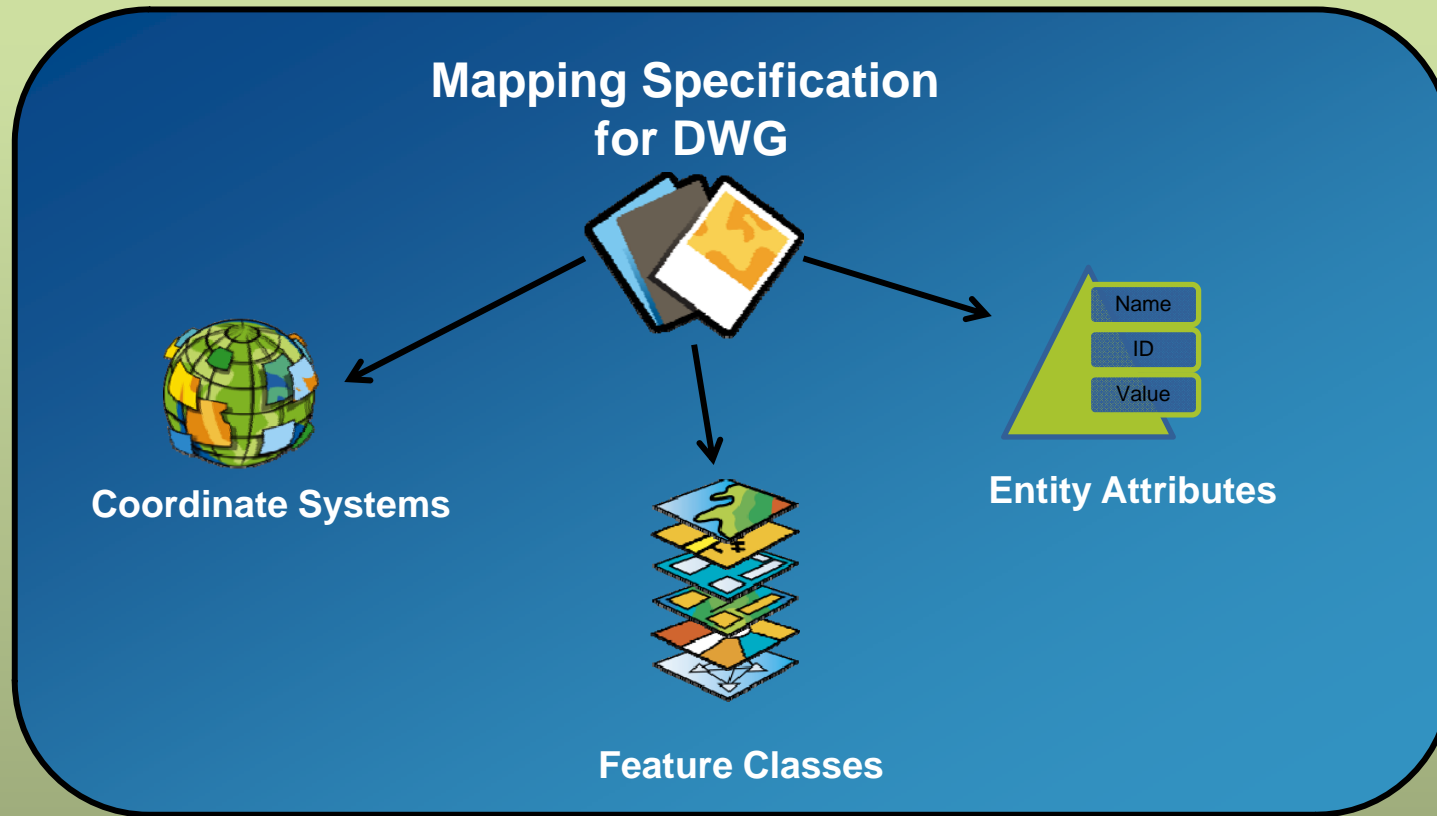
Demo: Data Loading from CAD
A better solution

- **Understand the goal**
  - Load just the new parcels with attributes

- **Understand the problem**
  - Parcel boundaries built into polygons
  - Attaching interior text as attribute
  - QA in CAD

- **Using the right tools**
  - CAD-based feature classes for polylines and text
  - Geoprocessing tools

If only we could use attributes in AutoCAD…

Feature Attributes in AutoCAD

ArcGIS for AutoCAD

Mapping Specification for DWG

Coordinate Systems

Name
ID
Value

Entity Attributes

Feature Classes

Demo: The Whole Picture

- **Data creation in CAD**
  - Typical CAD workflow
  - Maps as landmarks

- **Analysis and Data Management in GIS**
  - Server- or Engine-based tools

- **Data served to the Enterprise**
  - ArcGIS Server
  - ArcGIS for AutoCAD

What else could we do?

Today we covered

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Still have questions?

Additional Resources
Questions, answers and information…

- *Tech Talk*
  - *Outside this room right now!*

- *ESRI Resource Centers*
  - PPTs, code and video

   resources.esri.com

- *Social Networking*

   **www.twitter.com/
  ESRIDevSummit**

   **tinyurl.com/
  ESRIDevSummitFB**