

ArcGIS 9.2的地理处理应用

ESRI中国(北京)有限公司

售前技术支持部： 林雪淋

2006年11月

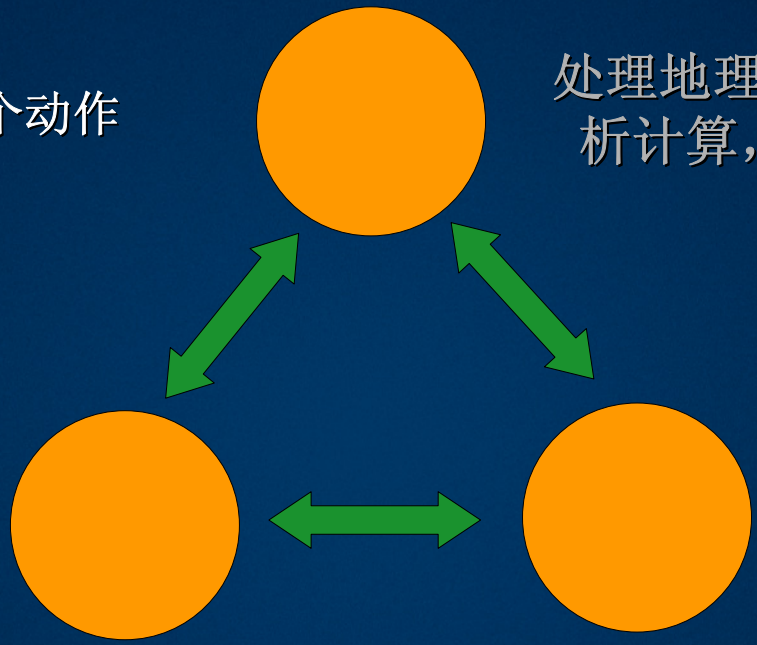
内　　容

- 什么是地理处理?
- ArcGIS Model Builder
- ArcGIS Scripting
- ArcGIS Server地理处理共享应用

Geoprocessing 是…

…GIS重要3个组成部分之一

Geo: 地理/地图数据
Processing: 执行一个动作
-数据转换
-数据管理
-空间分析
…



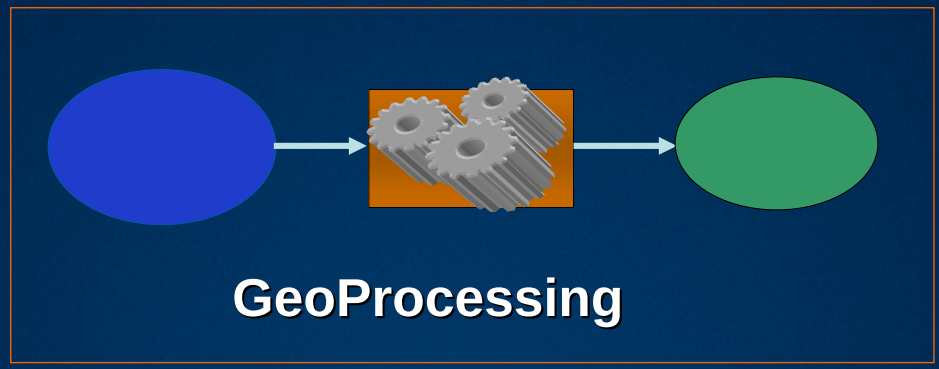
处理地理数据，数据分析计算，自动化流程

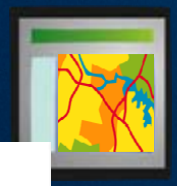
数据存储和管理
(Geodatabase)

可视化:
基于地图分析、浏览、编辑
（Desktop应用）

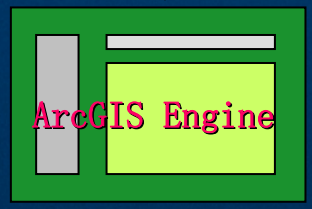
ArcGIS 9.2的地理处理框架

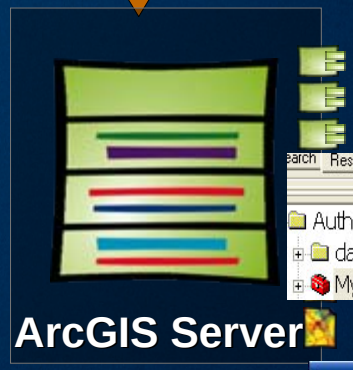
ArcGIS 9.2的Geoprocessing融合到Desktop,Engine,服务器端ArcGIS Server中

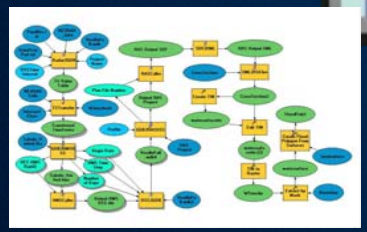




ArcGIS Desktop

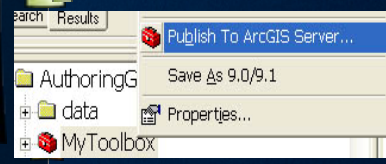


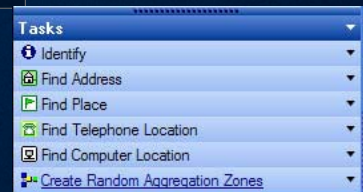




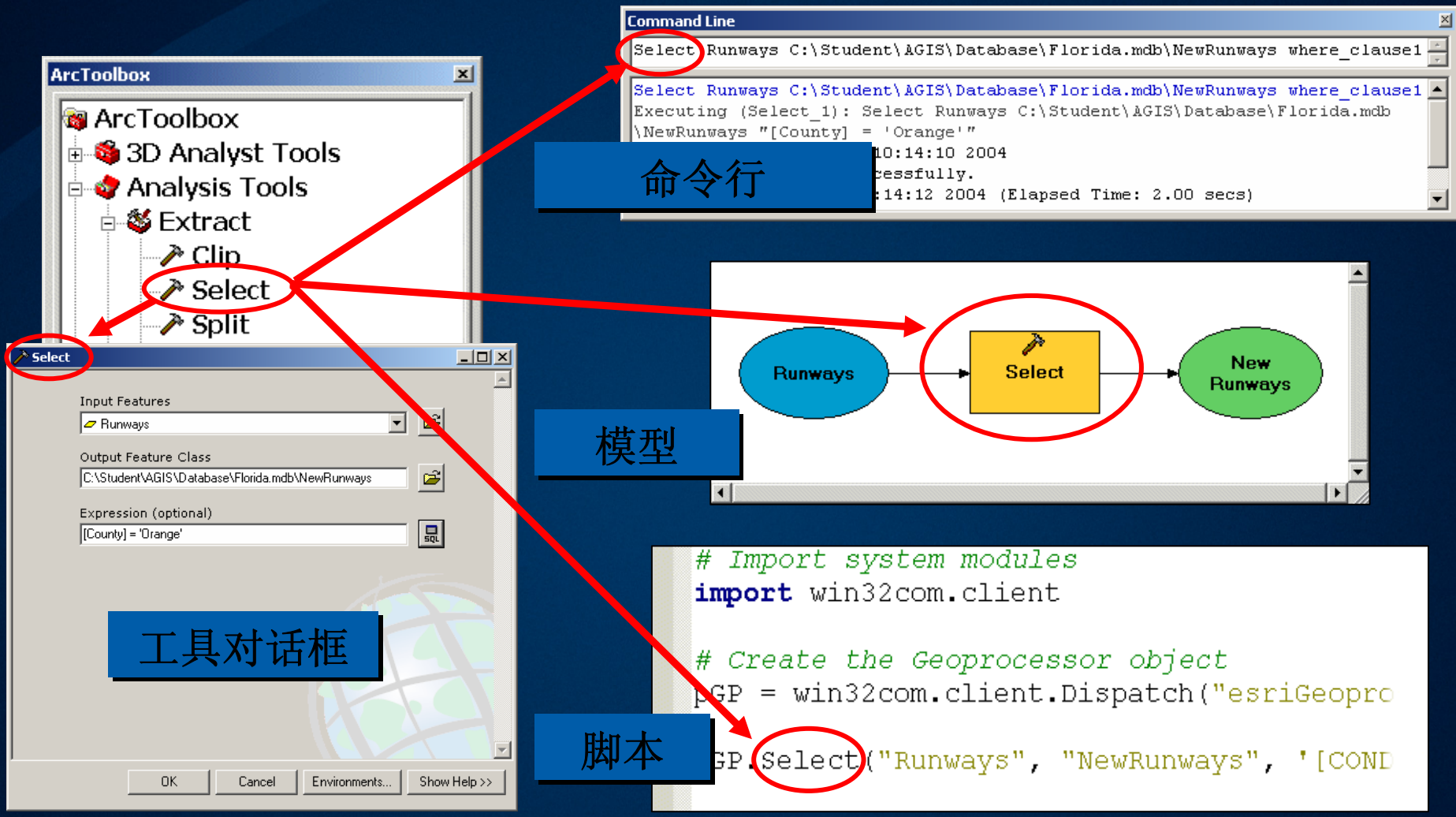


ArcGIS Explorer

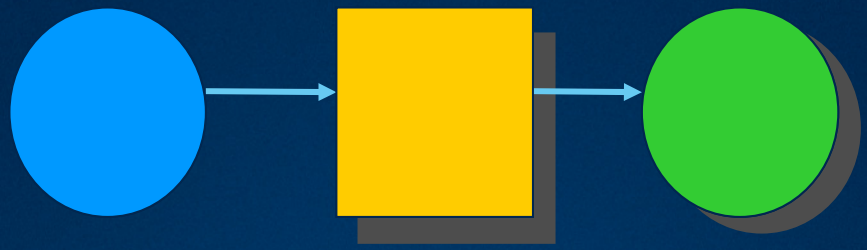




ArcGIS92地理处理框架：四种运行方式



ArcGIS Model Builder

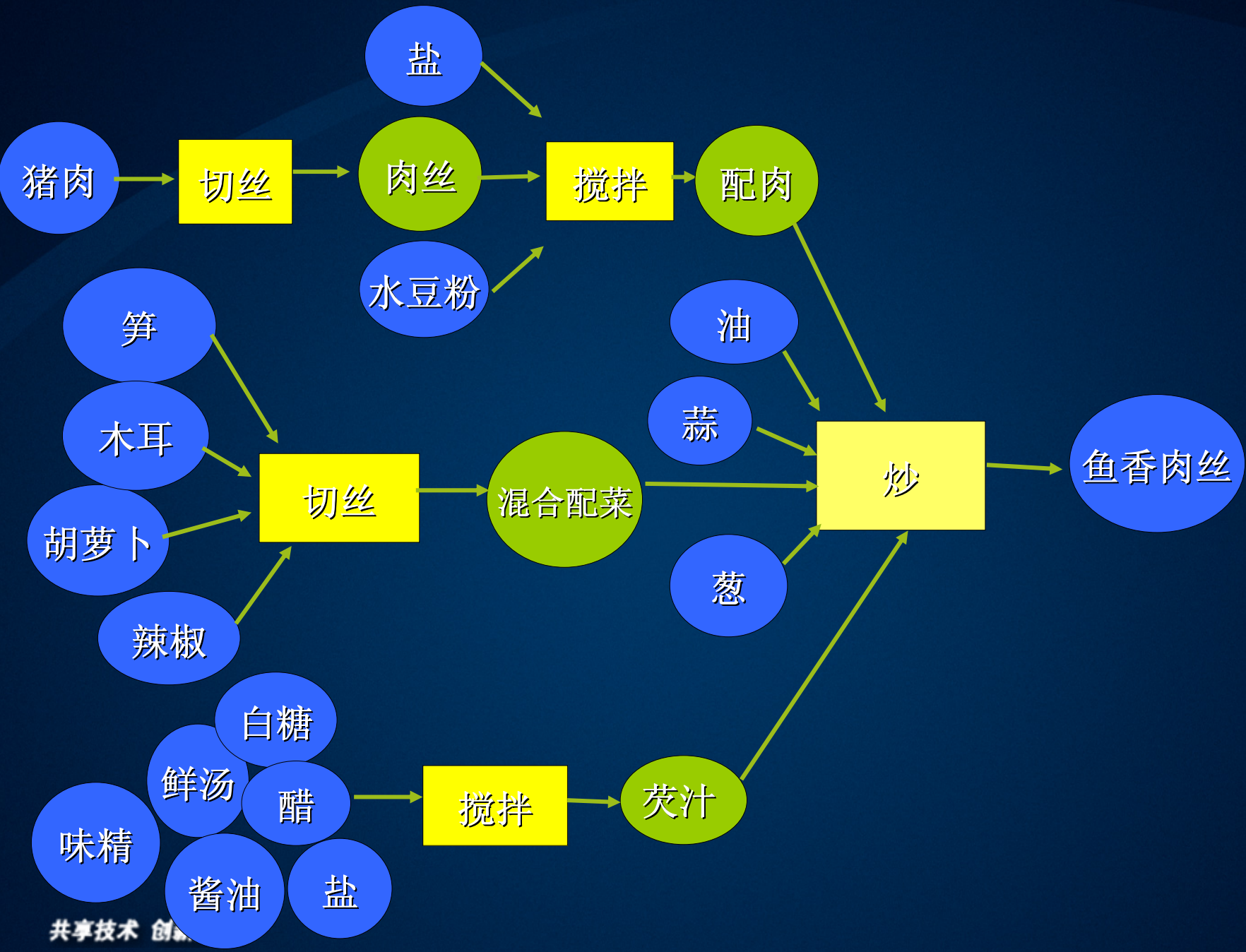


自动化地理模型生成

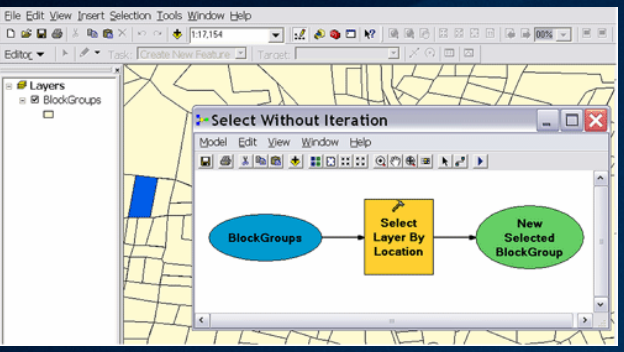
什么是Model?

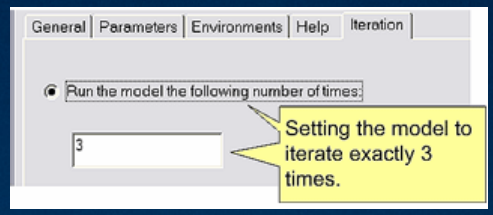
- 实际工作流程的表达
- 例子:鱼香肉丝菜谱



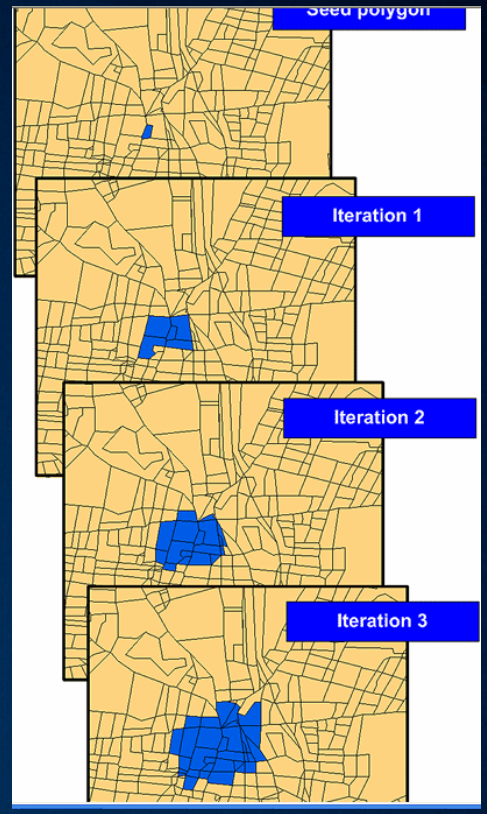

盐
猪肉
切丝
肉丝
搅拌
配肉
水豆粉
笋
木耳
胡萝卜
辣椒
切丝
混合配菜
油
蒜
葱
炒
鱼香肉丝
白糖
鲜汤
醋
味精
酱油
盐
搅拌
芡汁

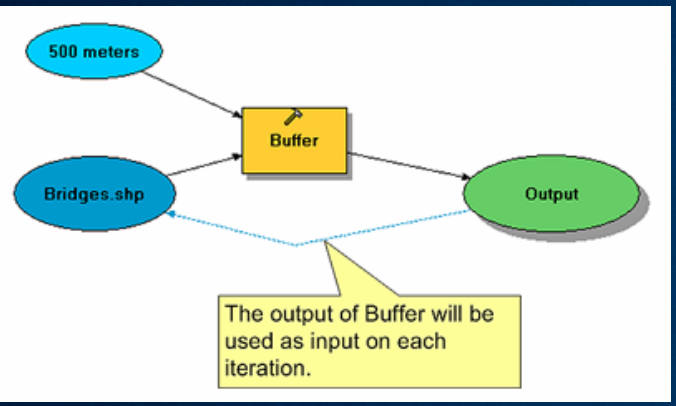
ModelBuilder功能



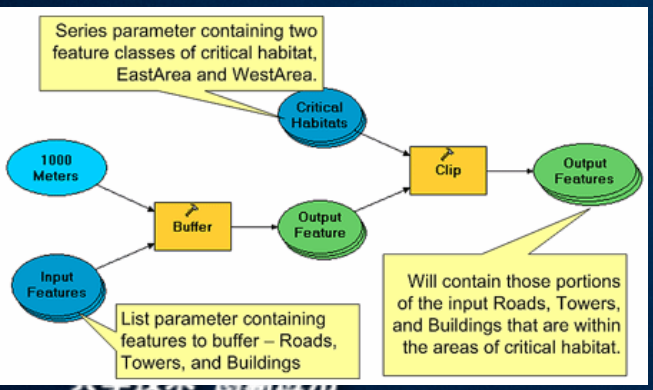


重复执行

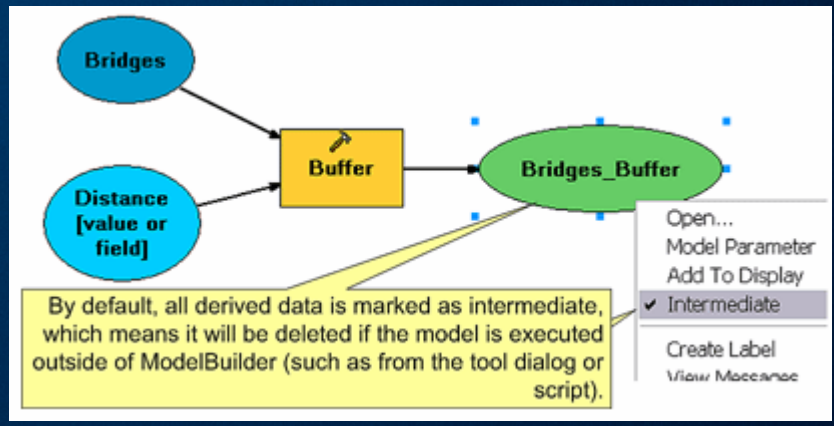




循环



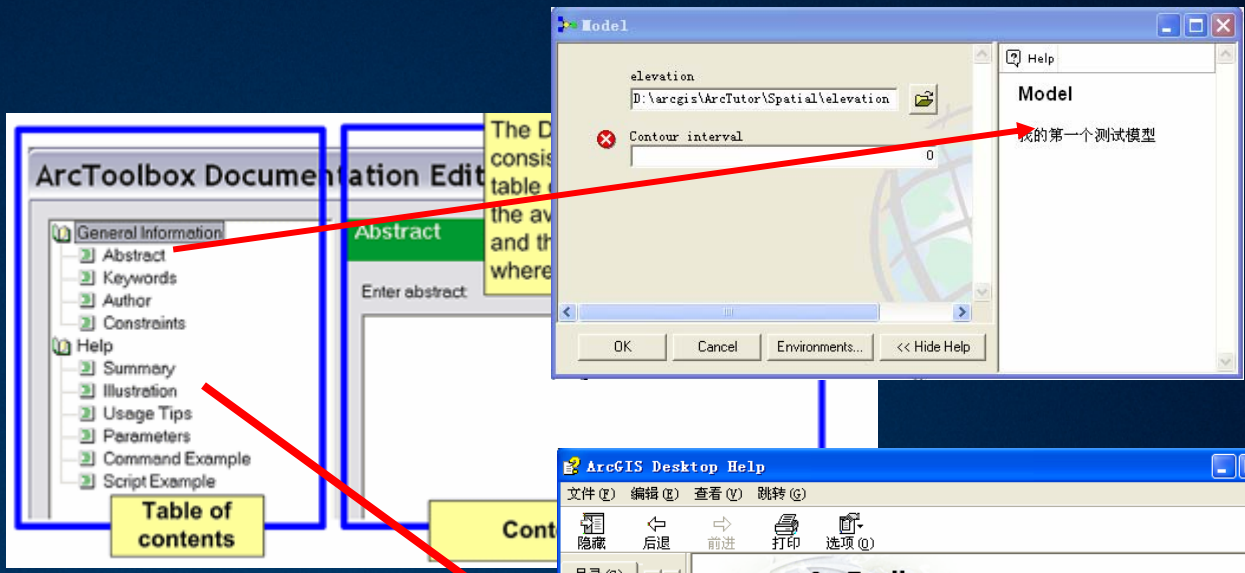
序列批处理

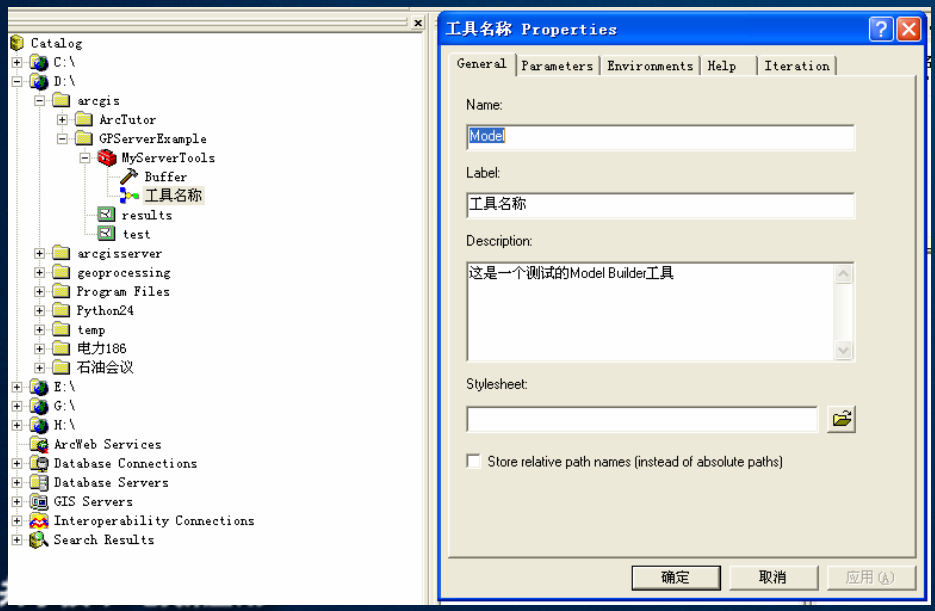


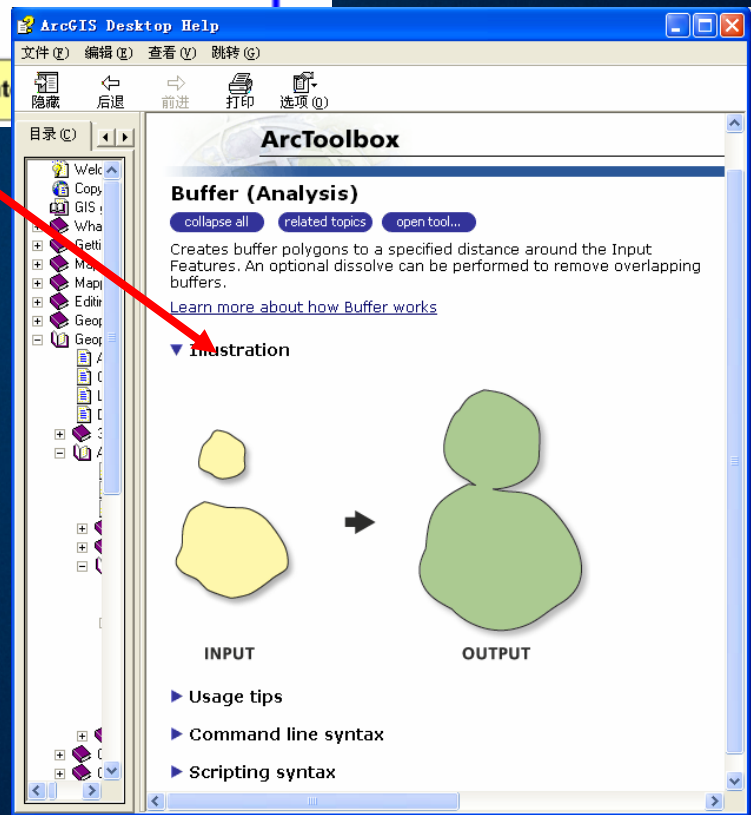
临时数据

描述(Documenting) 和分发(distributing)模型

- 制作与ArcToolBox中其它工具功能描述类似的工具
- 描述工具的用途与使用帮助







Model Builder 演示

火灾强度分析



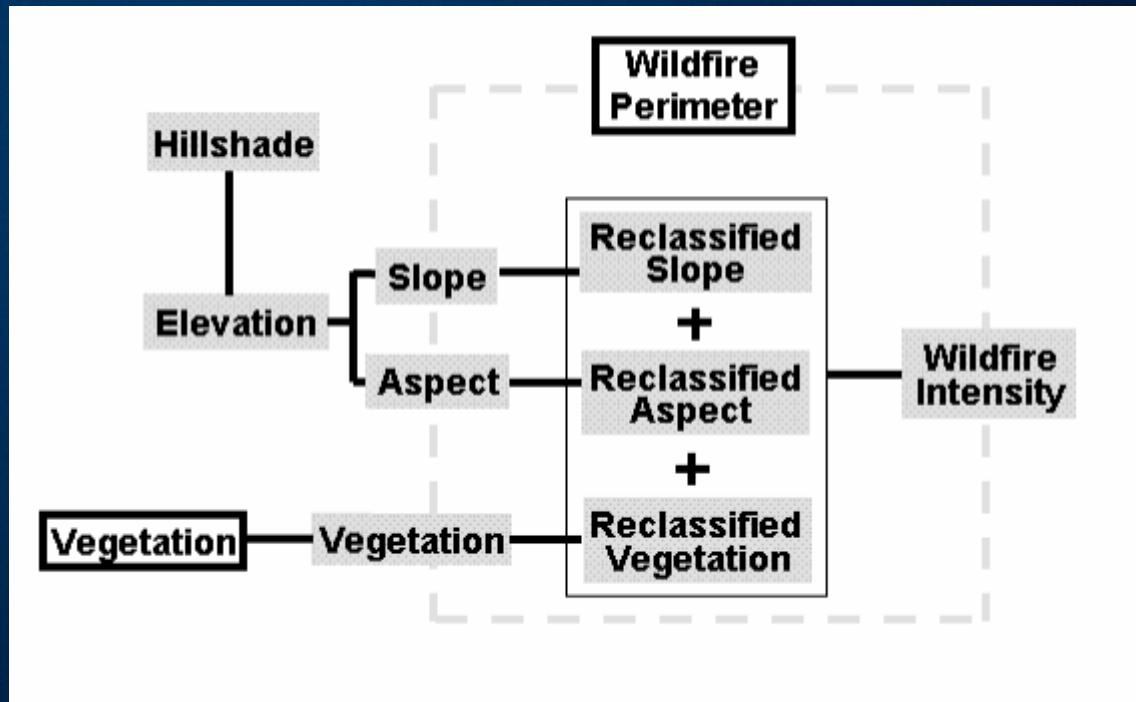
问题：哪里是火势强度最大的地方？

假设：

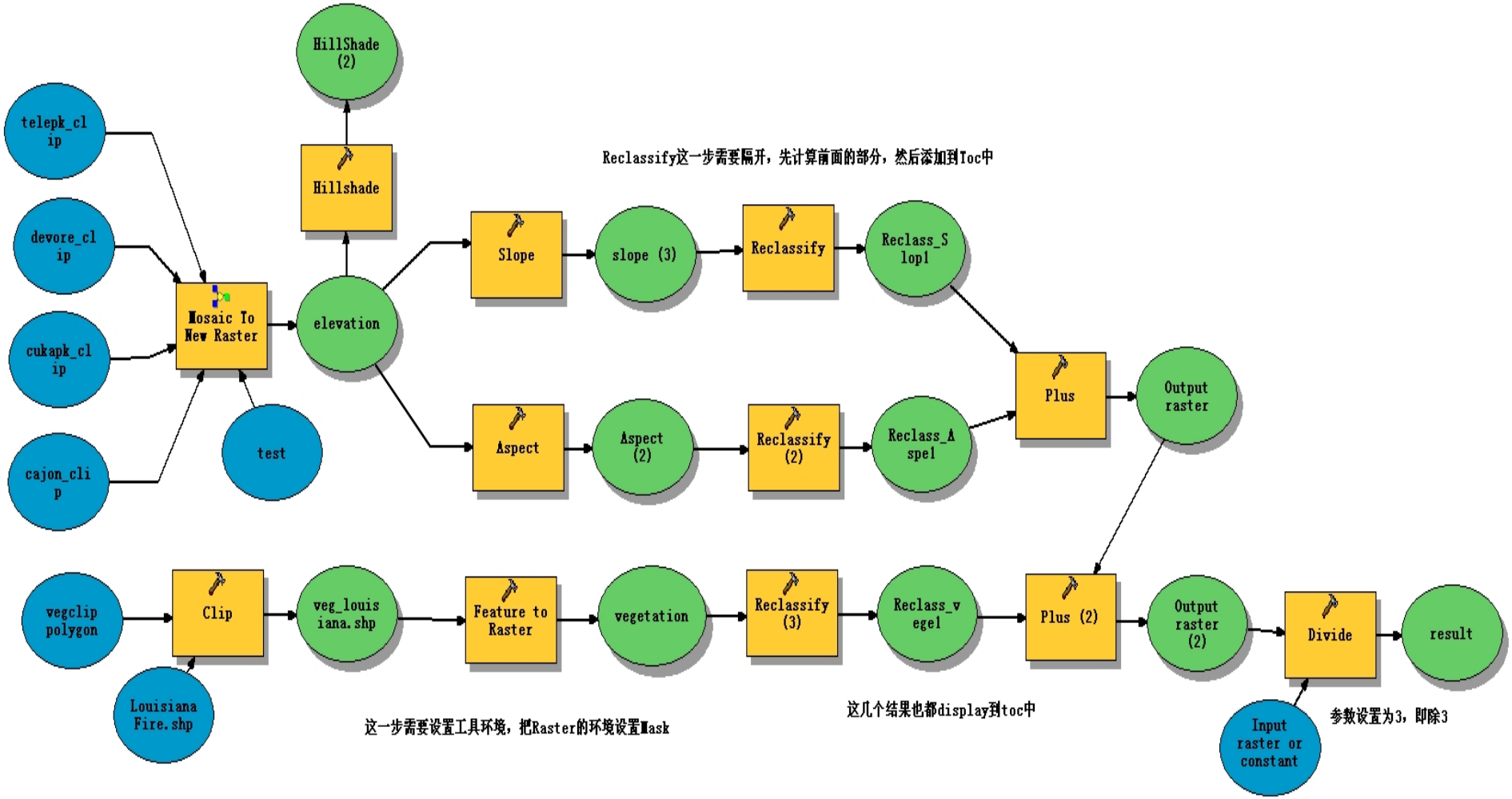
- 陡坡
- 坡向朝南
- 植被类型

数据需要：

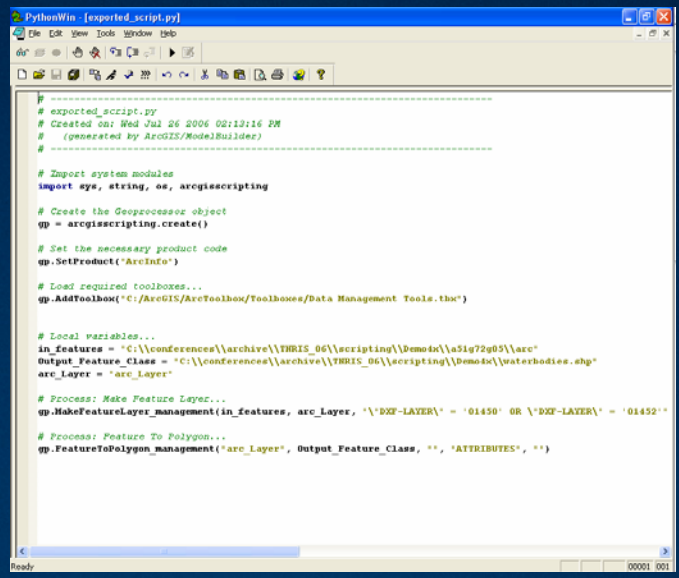
- DEM
- 坡度
- 坡向
- 植被
- Louisiana边界

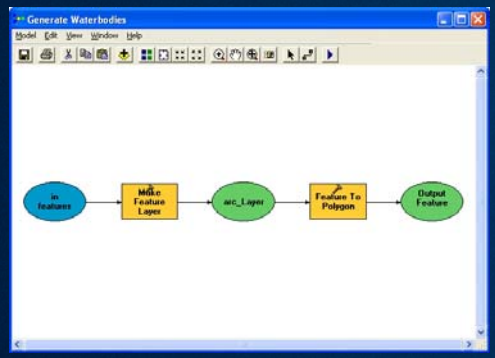


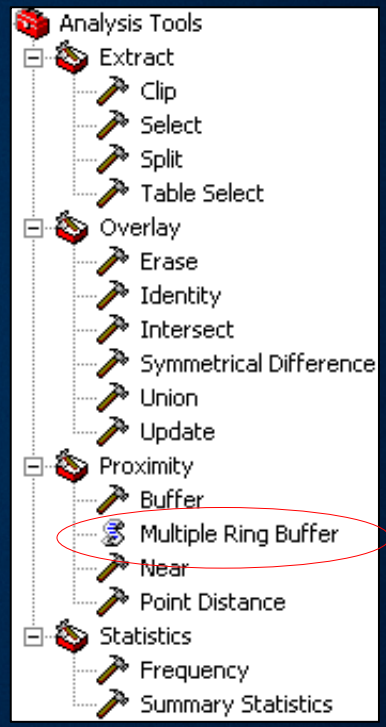
FireDemo Model Builder建模流程



ArcGIS92地理处理Scripting







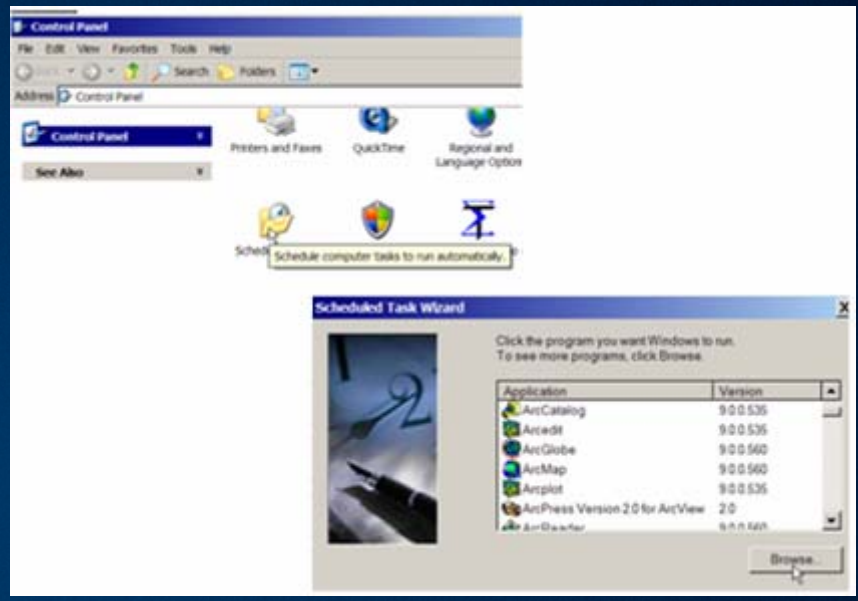
为什么使用脚本？

1、写计算机语言花费长，为什么使用脚本？

（1）、批处理能力

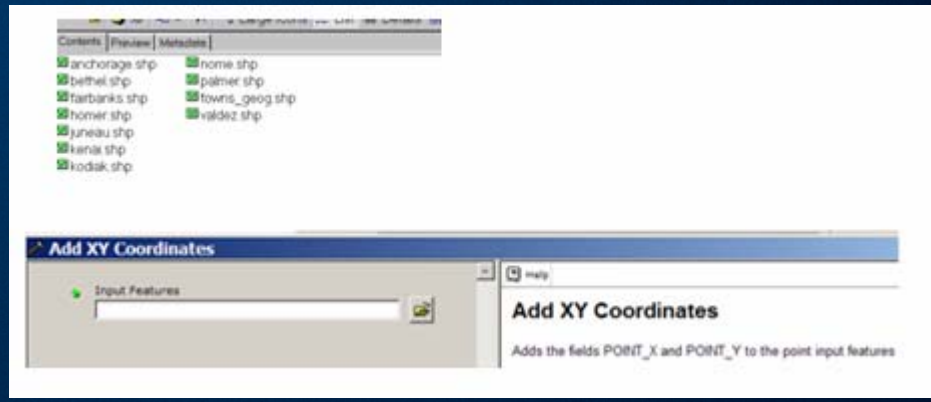
（2）、共享能力

（3）、计划任务执行



2、简单例子：

添加X,Y坐标到字段当中



脚本基础：地理处理器对象

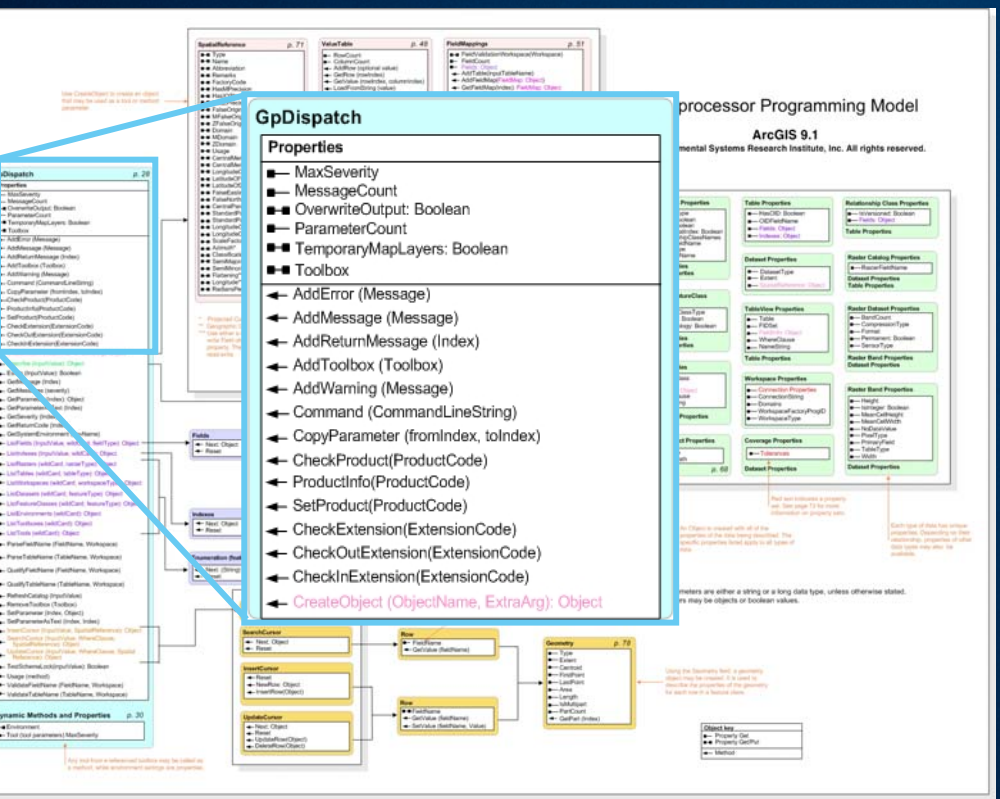
- 提供入口和环境来执行ArcGIS地理处理的工具
- 提供多数方法和属性，为脚本编程提供方便
  - e.g., List the shapefiles in a folder (ListFeatureClasses method)
  - e.g., Retrieve information about a feature class (Describe method)
  - e.g., Use a cursor to get field values from a table (SearchCursor method)
- 除了Python以外，地理处理器对象也可以为不同的脚本语言使用 (Perl, VBScript, JScript)

```
' ~~~ VBA/VB6 CODE ~~~
' Create Geoprocessing object
Dim pGP as Object
Set pGP = CreateObject("esriGeoprocessing.GPDispatch.1")

'Set the OverwriteOutput setting to True
pGP.overwriteoutput = True

' use Geoprocessing tools
pGP.CreateFeatureClass_management("C:\St_Johns", "roads.shp")
pGP.AddField_management("C:\St_Johns\roads.shp", "ROAD_NAME", "TEXT")
```

脚本基础：地理处理器对象(续)

- Geoprocessor是一个ArcObject,可以通过VB,COM访问,也支持那些支持COM接口IDispatch的脚本语言,例如VBScript,Python,Jscript,Perl

- GPDispatch ArcObject支持IDispatch,可以调用地理处理器对象,访问所有的ArcGIS地理处理能力





9.0&9.1与9.2变化

- 9.2不再依赖于win32com python模块
  - -新的python模块,arcgisscripting,提供了与9.0&9.1同样的功能
  - -Win32com仍然支持
- 为何改变?
  - -地理处理现在可以在arcgis engine和server中支持,并且支持UNIX和LINUX平台
  - -win32com只支持windows
  - -Arcgisscripting模块可以支持任何平台

9.2与以前版本的语法比较

- 9.0&9.1

```
#Import system modules
 import win32com.client
#Create the Geoprocessor object
gp=Win32com.client.Dispatch(“esriGeoprocessing.GpDispatch.1”)
```

- 9.2
- #Import system modules

```
  Import arcgisscripting
#Create the Geoprocessor object
  gp=arcgisscripting.create()
```

脚本处理语言环境：Python

- 为什么使用Python?

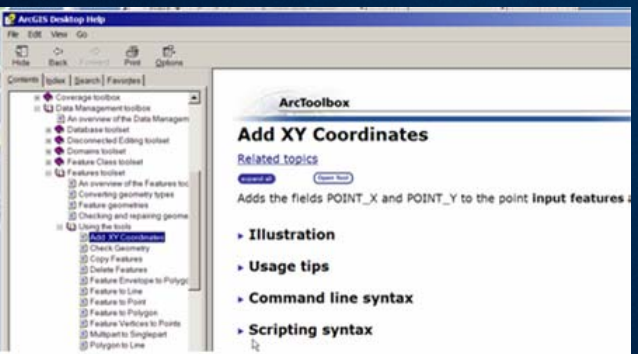
--随ArcGIS安装带的最常用地理处理脚本语言之一

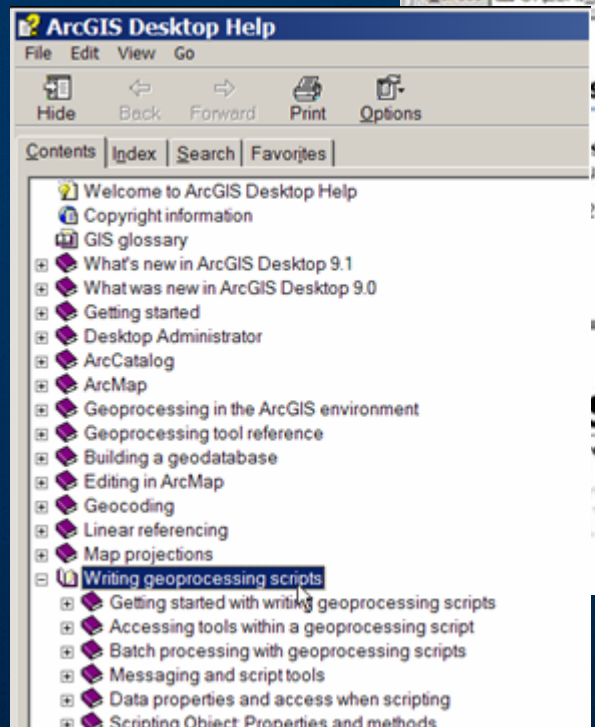
--与平台无关

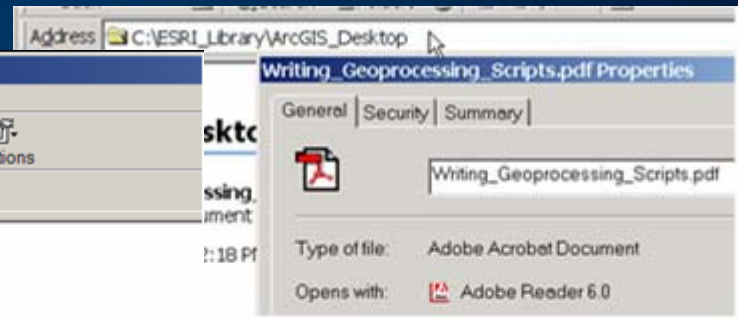
--可脱离ArcGIS平台运行（但要有License）

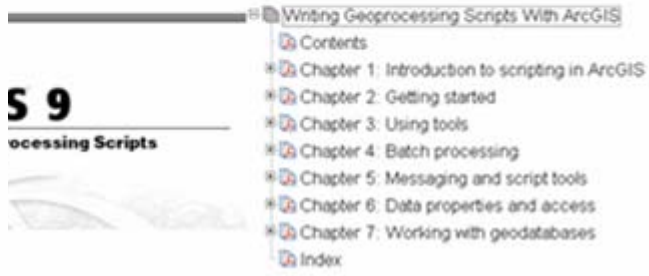
- Python学习参考

www.python.org









Python地理处理脚本简介
--注释

- 注释Comments:

  用#号来注释

```
# ---------------------------------------------------------------
# ClipAll.py
# ESRI Python script example
# Created on: 5/4/2005
# Description: Clips all of the feature classes in a workspace
# and puts the clipped feature classes in a specified workspace
```

Python地理处理脚本简介
--导入系统模块

- 标准代码，导入基本模块，创建地理处理器对象

```
# Import the win32com.client module:
# tells Python you want to use COM objects
import win32com.client
# Create a variable to access the Geoprocessor:
# provides access to geoprocessing tools
gp = win32com.client.Dispatch("esriGeoprocessing.GpDispatch.1")
```

```
import win32com.client, sys, os
```

-首先需要创建地理处理器,就需要调用IDispatch对象,导入win32模块,就允许python与COM IDispatch交互了

-9.2可以用Import arcgisscripting
gp=arcgisscripting.create()
替代！！

共享技术 创新应用

Python地理处理脚本简介
--输入参数

- Script arguments(system arguments):
  用户可以与脚本交互,可以为变量指定值,例如数据工作空间.

```
# Argument 1 identifies the input workspace where the input feature classes are located
InputWS = sys.argv[1]

# Argument 2 identifies the feature class you'll use to clip the input feature classes
ClipFC = sys.argv[2]

# Argument 3 identifies the output workspace where the clipped feature classes will go
OutputWS = sys.argv[3]
```

Python地理处理脚本简介
--使用工具

- 环境设置

```
# Set the current workspace
gp.workspace = InputWS
```

- 添加工具

- Analysis Tools—analysis
- Conversion Tools—conversion
- Data Management Tools—management
- 3D Analyst Tools—3d
- Cartography Tools—cartography
- Coverage Tools—arc
- Data Interoperability—interop
- Geocoding Tools—geocoding
- Geostatistical Analyst Tools—ga
- Linear Referencing Tools—lr
- Multidimension Tools—md
- Network Analyst Tools—na
- Samples—samples
- Spatial Analyst Tools—sa
- Spatial Statistics Tools—stats

```
# 使用分析工具的别名来指定clip工具
gp.clip_analysis("roads","urban_area","urban_roads")
#或使用引用工具
gp.Toolbox = "Analysis"
gp.Buffer(Roads, Output, "distance", "FULL", "ROUND",
"NONE", "")
#添加子定义工具
gp.AddToolbox("D:/St_Johns/Path Tools.tbx")
```

Python地理处理脚本简介
--批处理方法

- List-遍历功能

地理处理使用列举(enumeration)作为List功能的结果.Reset方法保证获得列举的第一个记录.Next方法返回当前选择值

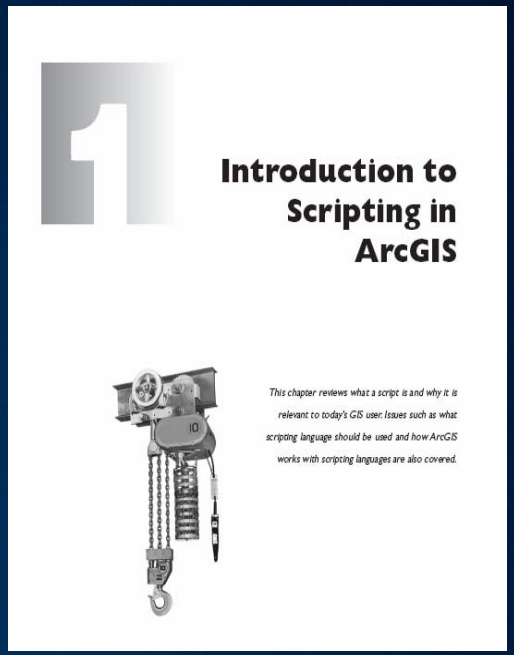
```
# Set the workspace. List all of the polygon feature classes that
# start with 'G'
gp.Workspace= "D:/St_Johns/data.mdb"
fcs = gp.ListFeatureClasses("G*","polygon")
```

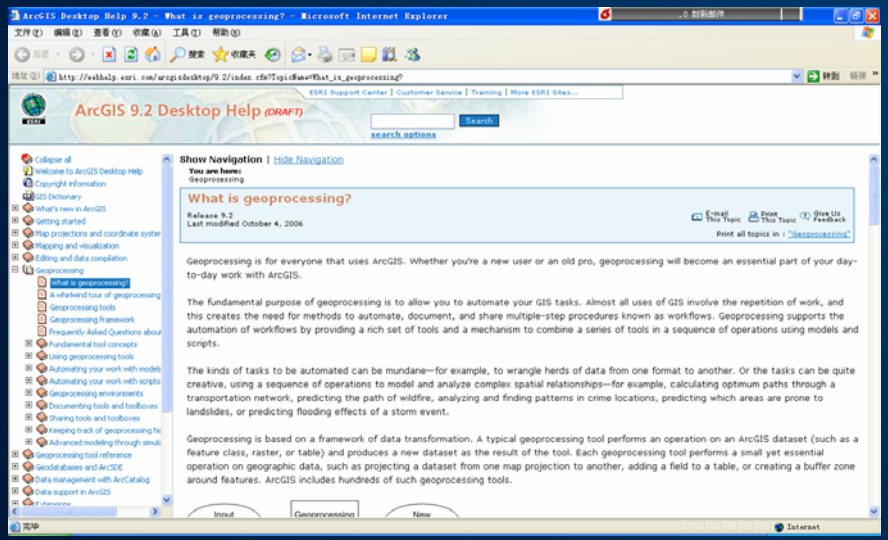
```
# Reset the enumeration to make sure the first object is returned
fcs.reset()
# Get the first feature class name
fc = fcs.next()
while fc: # While the feature class name is not None
    # Copy the features from the workspace to a folder
    gp.CopyFeatures(fc,"D:/St_Johns/Shapefiles/" + fc)
    # Get the next feature class name
    fc = fcs.next()
```



帮助

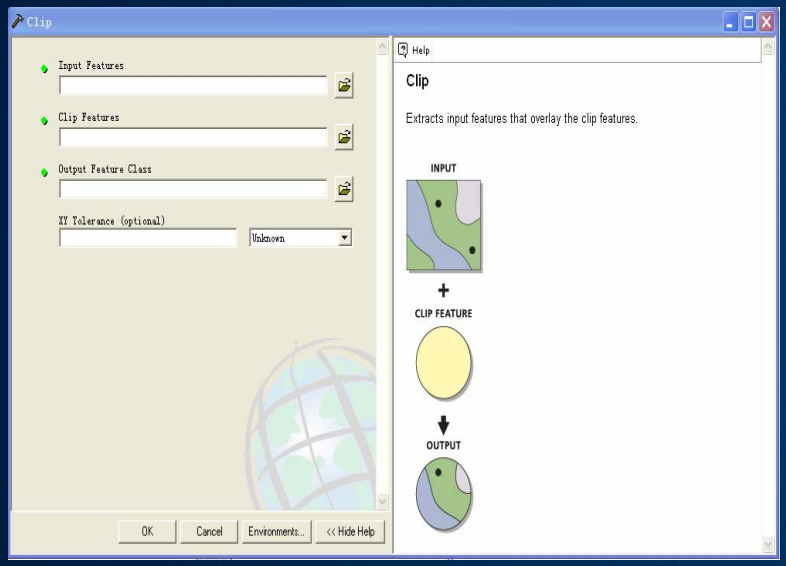
- *ArcGIS Desktop help*
- *<<Writing_Geoprocessing_Scripts>>*
- *ArcGIS Online Help*



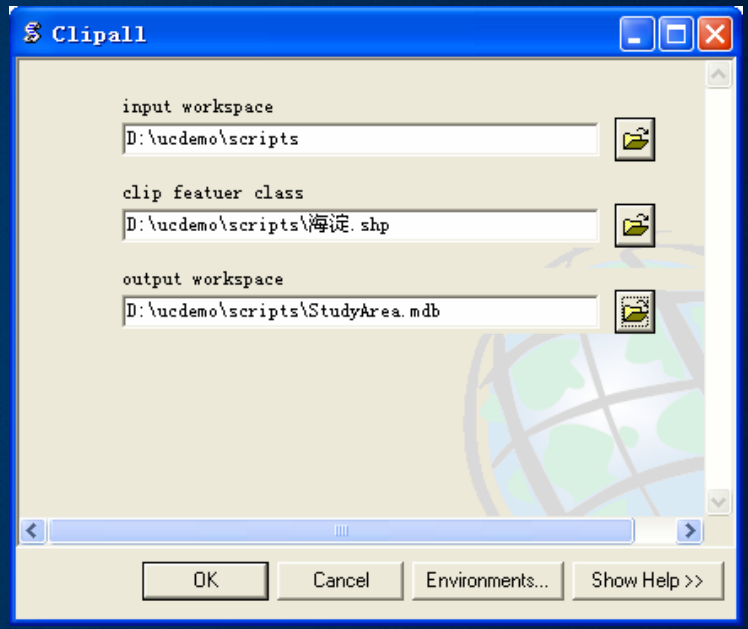


脚本演示

- 用Clip功能裁切文件夹下所有数据，结果入到pGDB当中



Toolbox:Clip工具只执行单个要素任务

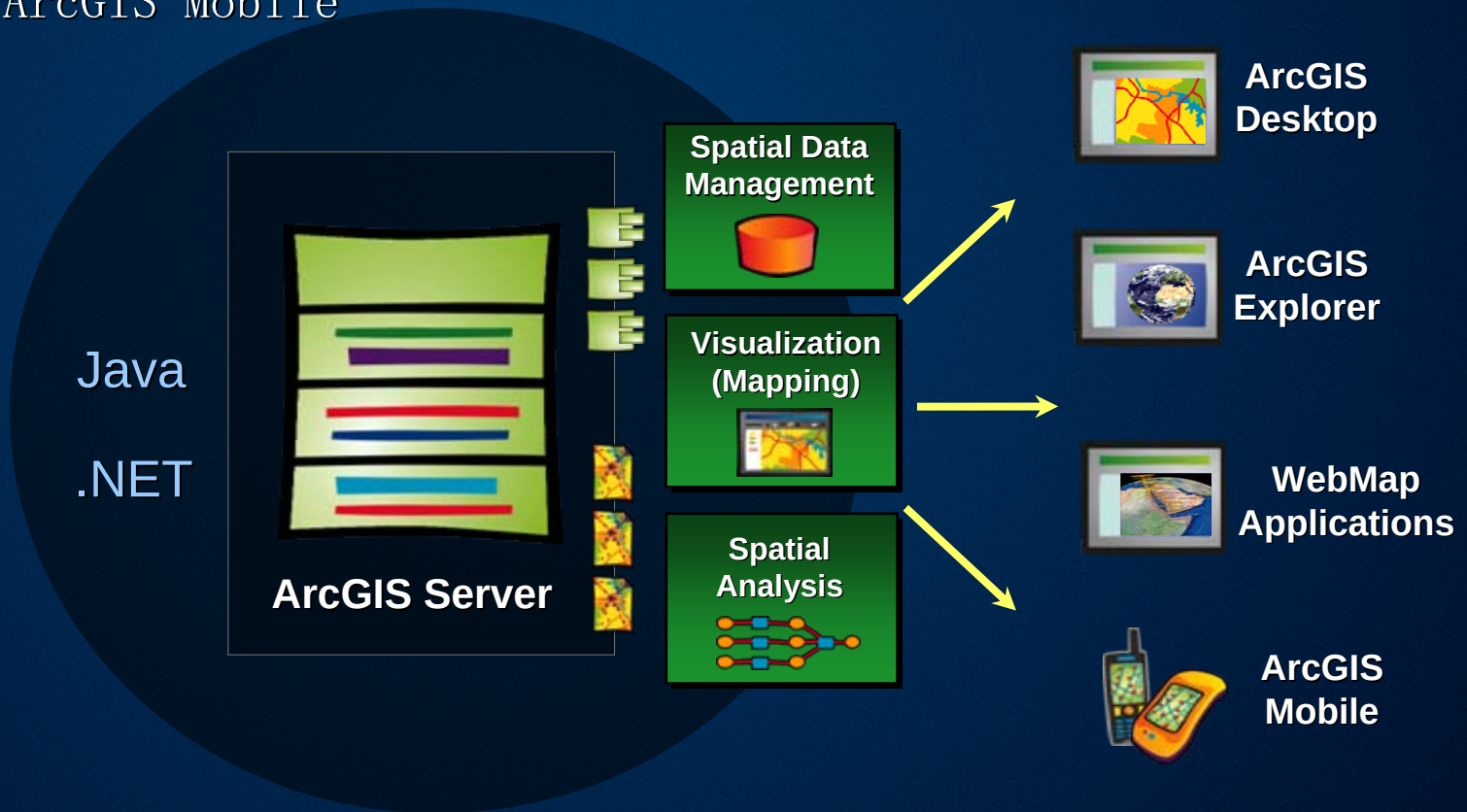


Python脚本: 处理所有要素任务

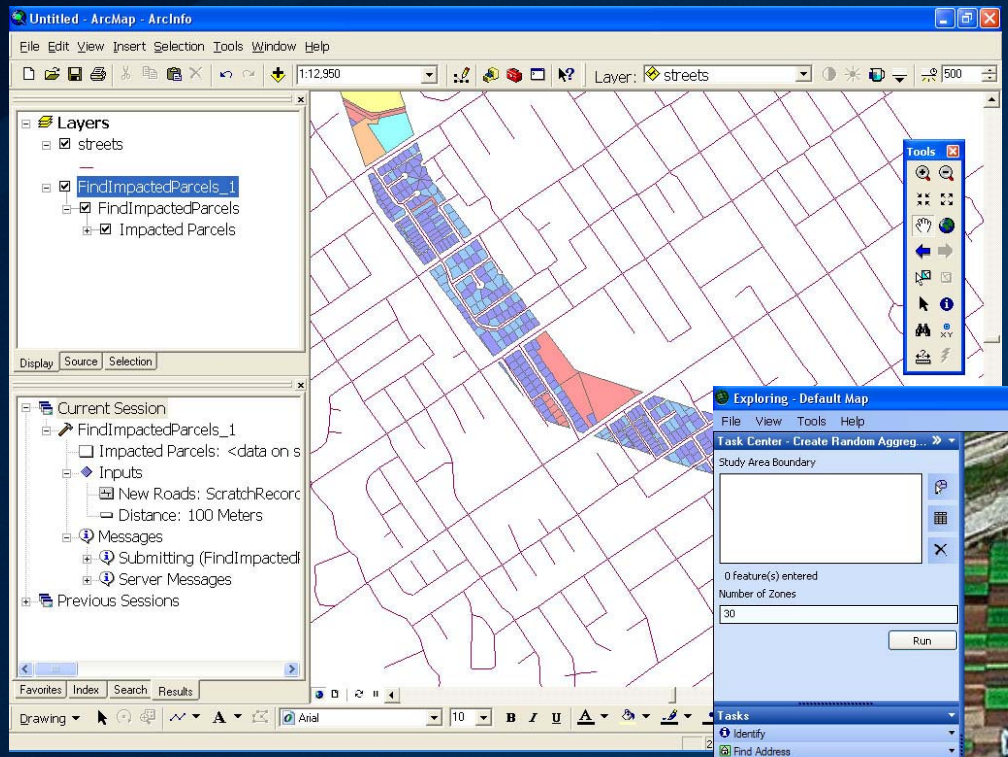
**很难在toolbox或model Builder中实现

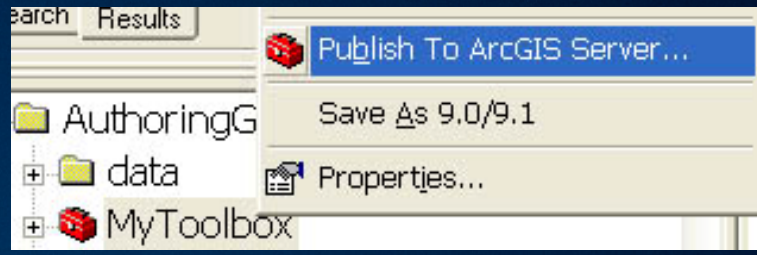
ArcGIS92地理处理共享应用

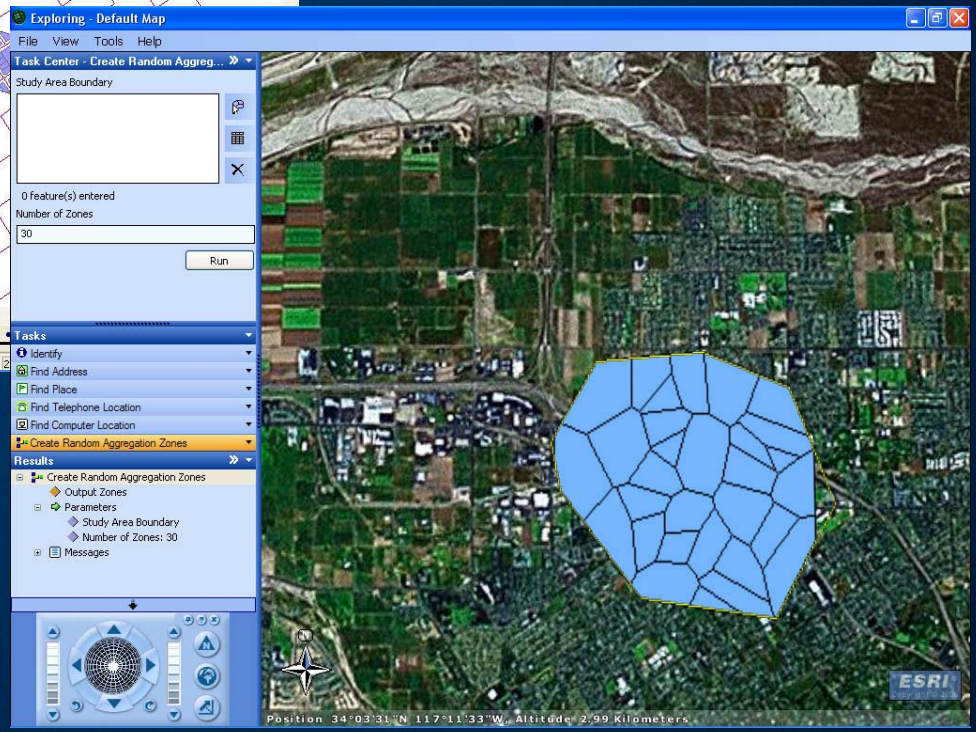
- ArcGIS Server地理处理网络共享
  - -服务器运行地理处理,瘦/胖客户端执行应用
  - -可以把空间数据与空间分析功能同时发布,方便不同级别用户使用
  - -无需编程
  - -支持四种客户端应用: ArcGIS Desktop; ArcGIS Explore; Web Application; ArcGIS Mobile



ArcGIS Desktop:使用地理处理服务



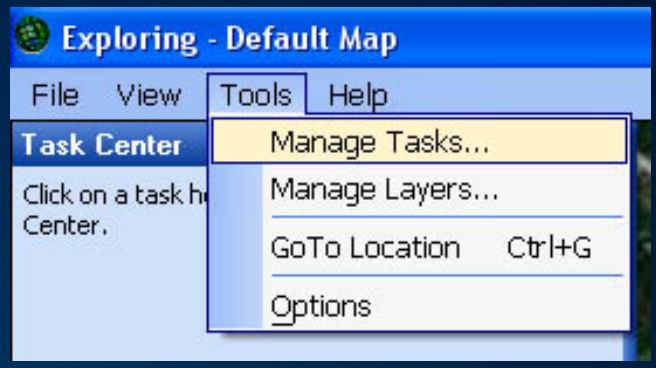


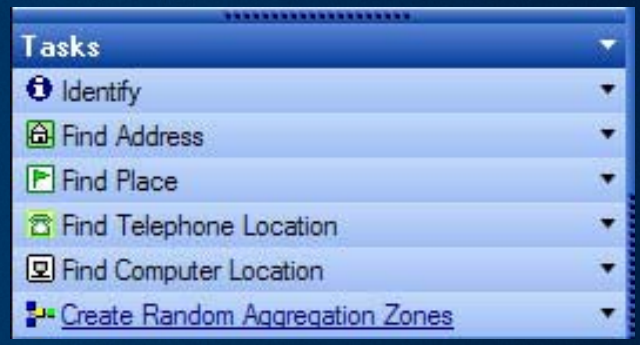


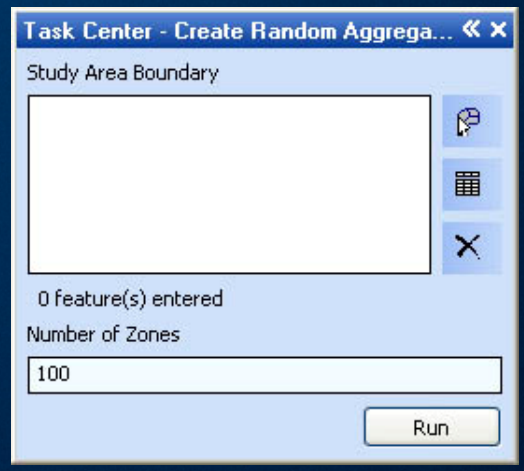


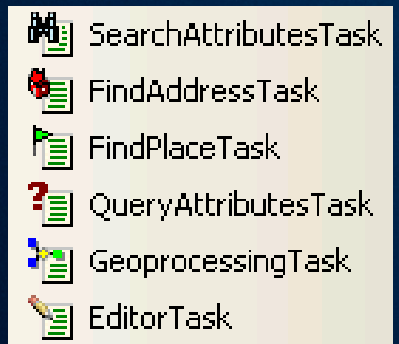
ArcGIS Explore:使用地理处理服务

- 地理处理服务在ArcGIS Explore中称为：“tasks”
- 使用任务管理器添加任务到Explorer中
- 在任务列表使用地理处理工具



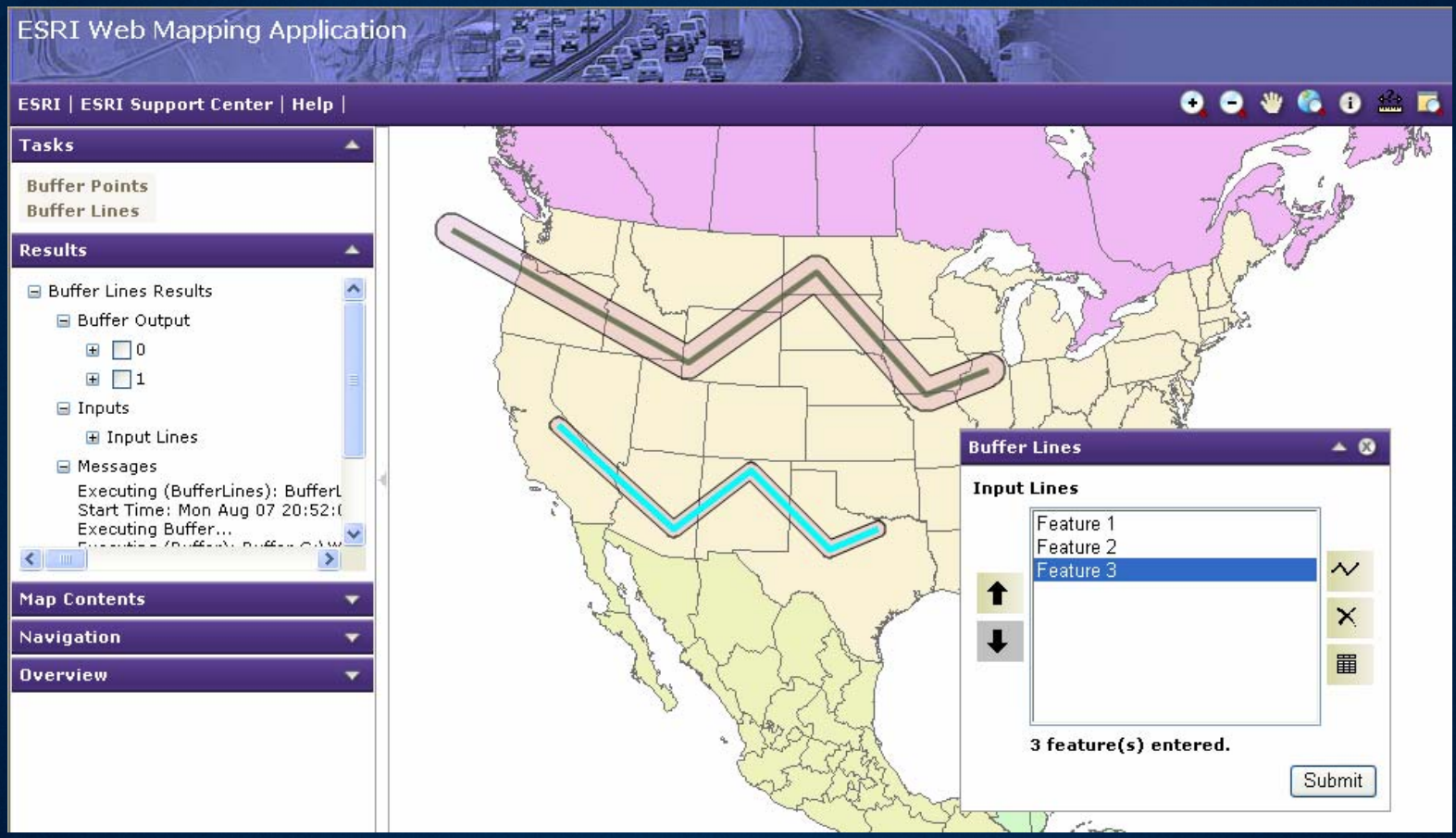






Web Mapping Application 摸版

- 地理处理任务对话在runtime时自动完成

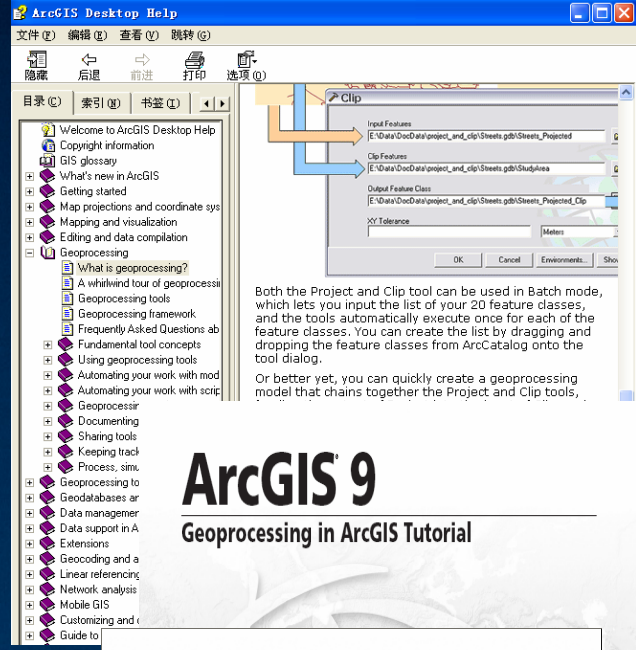


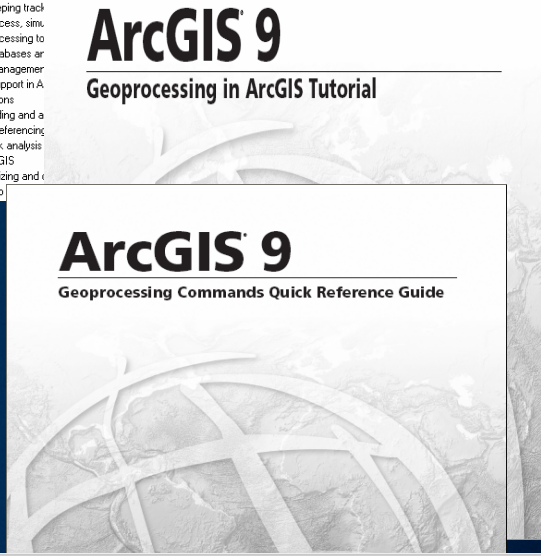
演示:地理处理共享发布

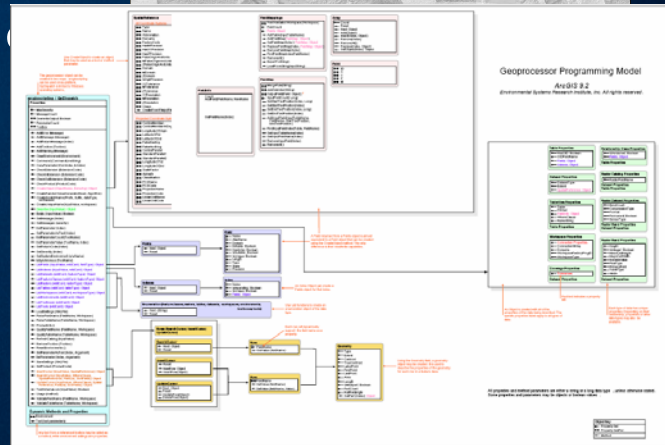
Desktop发布一个地图与Model,通过Desktop加载Server的Map,GP服务进行操作

帮助资源

- Geoprocessing
  - 地理处理使用手册
  - 桌面帮助系统
  - 在线帮助系统:
    - http://webhelp.esri.com/arcgisdesktop/9.1
    - http://webhelp.esri.com/arcgisdesktop/9.2
  - Geoprocessing support site
    - http://support.esri.com/geoprocessing
  - ArcScripts
    - http://arcscripts.esri.com/
- Python
  - Learning Python – O'Reilly (www.oreilly.
  - Python Organization (www.python.org)







总 结

- 地理处理为ArcGIS体系结构的核心
- 地理处理使地理分析和建模可视化,流程化,网络化,共享化
- 地理处理方便编程人员

关于”ArcGIS92地理处理应用”的讲座就到这里,谢谢大家!

现在休息15分钟,下一个讲座题目是”时态GIS在ArcGIS9.2平台的实现”,欢迎各位参加!

