



County of Los Angeles

Enterprise GIS Program

Web Services Guide

Internal Services Department
February 16, 2009

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<i>Version</i>	<i>Date</i>	<i>Author</i>	<i>Description</i>
0.1	7/02/08	Mark Greninger	Added Geocode service
0.2	7/03/08	Mark Greninger	Added RouteFromAddresses
0.3	7/10/08	Mark Greninger	Added GetDistrictInfoFromLatLong & GetDistrictInfoFromXY
0.4	2/16/09	Mark Greninger	Added GeocodeFindCandidates, RouteFromStopCoordinates,GetMileage, Get???fromXY functions

Geocoding Services (Geocode.asmx)

Geocode

Description

This service takes an input address or intersection and converts to X and Y coordinates, including corrections.

Location

<http://gis.lacounty.gov/services/geocode.asmx>

WSDL

<http://gis.lacounty.gov/services/geocode.asmx?wsdl>

Service History

- | | | |
|-----|----------------|---|
| 1.0 | July 2, 2008 | Initial Service Release |
| 2.0 | November, 2008 | Enhancements to provide corrected street names and better linkage with nationwide data. |
| 3.0 | February, 2009 | Better intersection matching, switch to enhanced reference file (NICKEL format). |

Parameters

Parameter	Usage
street1*	Street Address or First Intersecting Street
street2	Intersecting Street
Zip*	5-digit zip code*
City*	City
State	State

*required - Note: Either a 5-digit zip code *and/or* city are required. All three can be filled in.

Discussion

The Geocode function is designed for applications that require a single matched address (generally automated computer to computer communication), compared to the **GeocodeFindCandidates** function which returns a list of possible matches and which should be used for application developed. In fact, this service returns the first result from the **GeocodeFindCandidates** service. LA County reference files are extremely accurate and in most cases will provide the correct result, but in some cases, two candidates will have the same score, and this service will select only one.

Examples

<i>Address with Zipcode</i>	
street1	500 W Temple St
street2	
zip	90012
city	
state	

<i>Address with City, State</i>	
street1	500 W Temple St
street2	
zip	
city	Los Angeles
state	CA

<i>Address with Zipcode, City, State</i>	
street1	500 W Temple St
street2	
zip	90012
city	Los Angeles
state	CA

<i>Intersection Method 1</i>	
street1	W Temple St
street2	N Hill St
zip	90012
city	Los Angeles

state	CA
Intersection Method 2	
street1	W Temple St & N Hill St
street2	
zip	90012
city	Los Angeles
state	CA

Service Response

Response Type XML String

Notes: Note that the response is not delimited in this way (it is a string).

Parameter	Description
<string>	
<AddressGeocode>	Address wrapper
<InAddress>	
<Address>500 temple st</Address>	Input Address
<Zone>90012</Zone>	
<State></State>	
</InAddress>	
<HasGeocodeError>False</HasGeocodeError>	
<GeocodeErrorMessage></GeocodeErrorMessage>	
<OutAddresses>	
<AddressMatch AddressMatchId="1" Type="0">	Status
<RefId>248256</RefId>	Source Object ID
<Score>82</Score>	Match Score
<Side></Side>	Side of Street
<Address>500 E TEMPLE ST</Address>	Matched Address – this contains the corrected address.

<Zones>90012</Zones>	Matched Zipcode
<State></State>	Matched State
<Accuracy>TRNL_ZIP</Accuracy>	Source File
<InOutCommonZone></InOutCommonZone>	
<X>6489945.46332827</X>	X Coordinate
<Y>1840814.24805527</Y>	Y Coordinate
</AddressMatch>	
</OutAddresses>	
</AddressGeocode>	
</string>	

Known issues

#	Description	Date	Resolution
1	Intersections are not working	July 2, 2008	Resolved in Locators February 2009
2	Adding a city requires the state	July 2, 2008	Resolved November 2008
3	Incorrect Zipcode with correct city does not Geocode.	July 2, 2008	
4	If an entered address has a misspelled street name, the output does not return the correct street name.	July 2, 2008	Resolved November 2008
5	Intersections delineated by "&" placed in Street1 are not recognized.	July 2, 2008	Resolved in Locators February 2009
6	Intersections require a zipcode and/or city,state	July 2, 2008	Resolved in Locators February 2009

Data Sources

#	Description
1	First option is ESRI ArcGIS Server Composite Geocoder, which connects to the following data sources: <ul style="list-style-type: none"> a. Point Addresses from LA County b. Street Addresses (Zipcode and City) from LA County – supports Intersections
2	Second Option is ESRI ArcIMS Geocoder connecting to TeleAtlas geocoder – supports intersections

Code Source

Description

1	bdSystems (now SAIC) – ArcGIS Server link
2	ESRI (Mahesh) – Added RouteService Geocoder

GeocodeFindCandidates

Description This service returns a list of matching addresses and intersections to X and Y coordinates.
Location <http://gis.lacounty.gov/services/geocode.asmx?op=GeocodeFindCandidates>
WSDL <http://gis.lacounty.gov/services/geocode.asmx?wsdl>
Service History 1.0 January 2009 Initial Service Release

Parameters – same as *Geocode* function

Parameter	Usage
street1*	Street Address or First Intersecting Street
street2	Intersecting Street
Zip*	5-digit zip code
City*	City
State*	State

*required - Note: Either a 5-digit zip code *and/or* city are required. All three can be filled in.

Discussion

Where the *Geocode* function is designed for applications that require a single matched address, the *GeocodeFindCandidates* returns a list of possible matches and which should be used for application developed. Each function shares the exact same coding.

Examples

Address with Zipcode	
street1	500 W Temple St
street2	
zip	90012
city	
state	

Address with City, State

street1	500 W Temple St
street2	
zip	
city	Los Angeles
state	CA

Address with Zipcode, City, State

street1	500 W Temple St
street2	
zip	90012
city	Los Angeles
state	CA

Intersection Method 1

street1	W Temple St
street2	N Hill St
zip	90012
city	Los Angeles
state	CA

Intersection Method 2

street1	W Temple St & N Hill St
street2	
zip	90012
city	Los Angeles
state	CA

Service Response

Response Type XML String

Notes: Note that the response is not delimited in this way (it is a string).

Parameter	Description
<string>	
<AddressGeocode>	Address wrapper
<InAddress>	
<Address>500 temple st</Address>	Input Address
<Zone>90012</Zone>	
<State></State>	
</InAddress>	
<HasGeocodeError>False</HasGeocodeError>	
<GeocodeErrorMessage></GeocodeErrorMessage>	
<OutAddresses>	
<AddressMatch AddressMatchId="1" Type="0">	Start First Match Result
<RefId>248256</RefId>	Source Object ID
<Score>82</Score>	Match Score
<Side></Side>	Side of Street
<Address>500 E TEMPLE ST</Address>	Matched Address
<Zones>90012</Zones>	Matched Zipcode
<State></State>	Matched State
<Accuracy>TRNL_ZIP</Accuracy>	Source File
<InOutCommonZone></InOutCommonZone>	
<X>6489945.46332827</X>	X Coordinate
<Y>1840814.24805527</Y>	Y Coordinate
</AddressMatch>	
<AddressMatch AddressMatchId="2" Type="0">	Start Second Match Result
...	Same format at first result
</AddressMatch>	
</OutAddresses>	
</AddressGeocode>	

</string>

--

Known issues

#	Description	Date	Resolution
1	See issues under the <i>Geocode Function</i>		

Data Sources

#	Description
1	First option is ESRI ArcGIS Server Composite Geocoder, which connects to the following data sources: <ul style="list-style-type: none">a. Point Addresses from LA Countyb. Street Addresses (Zipcode and City) from LA County – supports Intersections
2	Second Option is ESRI ArcIMS Geocoder connecting to TeleAtlas geocoder – supports intersections

Code Source

#	Description
1	bdSystems (now SAIC) – ArcGIS Server link
2	ESRI (Mahesh) – Added RouteService Geocoder

Routing Services (route.asmx)

RouteFromAddresses

Description	This service generates driving directions (route), total distance, total time, and optionally, a map from a list of addresses.	
Location	http://gis.lacounty.gov/services/route.asmx?op=RouteFromAddresses	
WSDL	http://gis.lacounty.gov/services/route.asmx?wsdl	
Service History	1.0 July 2, 2008	Mark Greninger

Parameters

Parameter	Usage
Addresses*	Semi-colon delimited List of Addresses
ShowRouteMap	(true or false) – flag for whether a link to a map showing the route should be returned Blank = false (default)
Optimize	Intermediate Stops are reordered to minimize travel distance (requires at least 4 stops). Please see notes below, and the ESRI “Using ArcIMS RouteServer” file. See: http://gis.lacounty.gov/eGIS/wp-content/uploads/2008/07/usingarcimsrouteserver.pdf Blank = false (default)
Projection	Numeric projection code defining the coordinate system (projection) of the output results: Blank = 102645 (default) : State Plane Zone 5 4326 is the most commonly used code, returning Geographic Coordinate (i.e. -118, 34) for overlay on commercial mapping APIs. For more projection codes, see: http://edndoc.esri.com/arcims/9.0/ - click on the “Coordinate IDs and Description”

*required

Examples

<i>Two Addresses with Map</i>	
Addresses	222 S Hill St, 90012; 9150 E Imperial Hwy, 90242

ShowRouteMap	true
Optimize	
Projection	

<i>Two Addresses with Geographic Projection</i>	
Addresses	222 S Hill St, 90012; 9150 E Imperial Hwy, 90242
ShowRouteMap	
Optimize	
Projection	4326

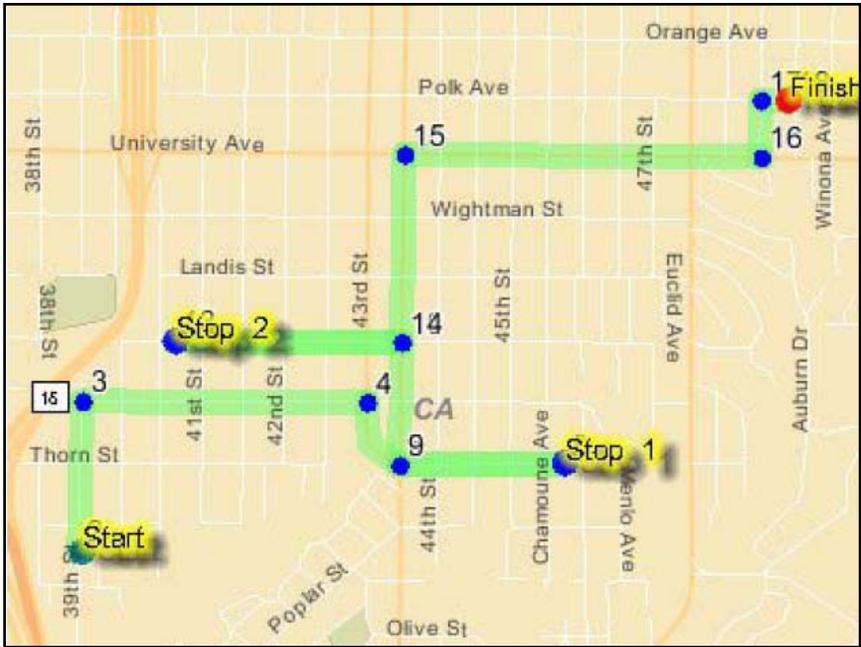
<i>Multiple Addresses</i>	
Addresses	222 S Hill St, 90012; 3625 Sierra Vista Ave, Glendale, CA;9150 E Imperial Hwy, 90242; 9402 Via Yolanda, Burbank, CA;222 S Hill St, 90012
ShowRouteMap	
Optimize	
Projection	

<i>Multiple Addresses with Optimization and Map</i>	
Addresses	222 S Hill St, 90012; 3625 Sierra Vista Ave, Glendale, CA;9150 E Imperial Hwy, 90242; 9402 Via Yolanda, Burbank, CA;222 S Hill St, 90012
ShowRouteMap	true
Optimize	true
Projection	

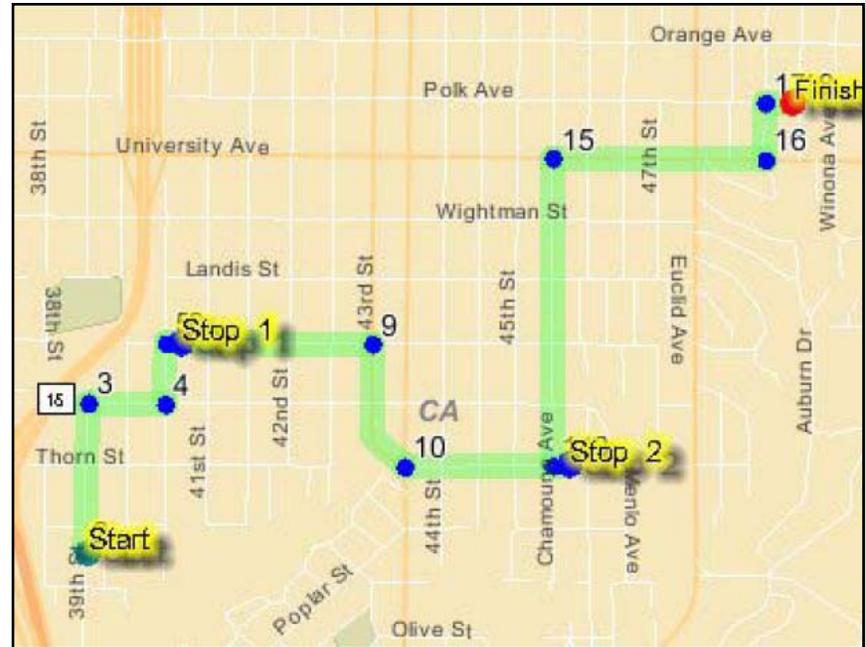
Discussion of Optimization

The RouteService generates a fair amount of confusion, primarily around the concept of optimization. Here is an explanation from ESRI's *Using ArcIMS RouteServer*

“ArcIMS Route Server supports optimization of route stops. First and Last stops are fixed, while intermediate stops are reordered to minimize travel distance. The optimization feature requires at least two intermediate stops. The two pictures below illustrate a non-optimized and an optimized route.”



non-optimized route



optimized route

Service Response

Response Type XML Object: RouteOutput
 Notes: The response contains different objects depending upon the inputs.
 The response below is a subset of a full response

Parameter

Description

<RouteOutput>

<Name>Output Route</Name>

<ErrorMessage></ErrorMessage>

<RouteEnvelope>

<MinX>-118.233266</MinX>

<MinY>34.20516</MinY>

Always the same

Place for error messages

This is a definition for a box that will show the entire route. Note that the coordinates are in geographic format – this means that the projectioncode of 4326 was entered.

```

    <MaxX>-118.233193</MaxX>
    <MaxY>34.206269</MaxY>
  </RouteEnvelope>
  <RouteParts><RoutePart><RouteSegments>

  <RouteSegment>
    <Distance>0.076831</Distance>
    <Time>0.184422</Time>
    <Direction>Continue North on Sierra Vista
    AVE</Direction>
    <DriveText>Drive < 0.1 mile(s) ~ < 1 minute</DriveText>
    <Coords>-118.233266 34.205160;-118.233193
    34.206269</Coords>
    <SegmentEnvelope></SegmentEnvelope>
  </RouteSegment>
  <ImageUrl>
  http://gismapdb1.co.la.ca.us/output/RouteService_gismapdb1622
  037128.gif
  </ImageUrl>
  <RouteTotals>
    <Distance>85.793721</Distance>
    <Time>91.429031</Time>
    <TotalDistanceDescription>Driving distance: 85.8
    mile(s)</TotalDistanceDescription>
    <TotalTimeDescription>Driving time: 1 hour(s) 31
    minute(s)</TotalTimeDescription>
  </RouteTotals>
</RouteOutput>

```

Surrounding tags. Note that a Route is made up of one or more RouteParts, a list of RoutePart objects. Each RoutePart object is made up of RouteSegments, which is made up of one or more RouteSegment Objects (below).

Each RouteSegment object is a single driving segment between two turns. Each segments contains

- 1) **Distance** in miles
- 2) **Time** in minutes (decimal format)
- 3) **Directions** in plain English
- 4) **Distance** in plain English
- 5) The **coordinates** that draw this segment on the map. Note that in the example on the left, the coordinates geographic lat/long – so the projectioncode parameter of 4326 was entered.

This response is available if the ShowRouteMap parameter is **true**. This is a URL to an image showing the route on a map.

This is the summary of the entire route:

- 1) **Distance** in miles
- 2) **Time** in minutes (decimal format)
- 3) **Total Distance** in plain English
- 4) **Total Time** in plain English

Known issues

#	Description	Date	Resolution
1	Intersections are not working – related to the issues with geocoding	July 3, 2008	
2	Maps drawn using the “ShowRouteMap” parameter set to true do not reflect optimization – they reflect the order of the entered addresses. However, the actual driving directions do reflect optimized stops.	July 3, 2008	October 22, 2008
3	Maps cannot be drawn using a projection code (if you set “showRouteMap” to true AND use projectioncode 4326, a blank map gets drawn).	July 3, 2008	October 22, 2008

Data Sources

Description

- | | |
|---|--|
| 1 | Addresses are geocoded using the Geocode service. |
| 2 | Routes are generated from ArcIMS RouteServer using TeleAtlas |

Code Source

Description

- | | |
|---|------------------|
| 1 | ESRI - June 2008 |
|---|------------------|

RouteFromStopCoordinates

Description	This service generates driving directions (route), total distance, total time, and optionally, a map from a list of addresses.
Location	http://gis.lacounty.gov/services/route.aspx?op=RouteFromStopCoordinates
WSDL	http://gis.lacounty.gov/services/route.aspx?wsdl
Service History	1.0 July 2, 2008 Mark Greninger

Parameters

Parameter	Usage
StopCoordinates*	Semi-colon delimited List of XY Coordinate Pairs (comma separated)*.
ShowRouteMap	(true or false) – flag for whether a link to a map showing the route should be returned Blank = false (default)
Optimize	Intermediate Stops are reordered to minimize travel distance (requires at least 4 stops). Please see notes below, and the ESRI “Using ArcIMS RouteServer” file. See: http://gis.lacounty.gov/eGIS/wp-content/uploads/2008/07/usingarcimsrouteserver.pdf Blank = false (default)
Projection	Numeric projection code defining the coordinate system (projection) of the output results: Blank = 102645 (default) : State Plane Zone 5 4326 is the most commonly used code, returning Geographic Coordinate (i.e. -118, 34) for overlay on commercial mapping APIs. For more projection codes, see: http://edndoc.esri.com/arcims/9.0/ - click on the “Coordinate IDs and Description”

*required

Discussion

All response parameters, known issues, data source, and code source is the same as the **RouteFromAddresses** function.

RouteFromStopCoordinates is essentially the same function as the **RouteFromAddresses** function, supporting similar parameters. The major difference is that this function does not geocode addresses before creating a route, so can be significantly faster. It is designed to be used where one or more of the incoming stop coordinates has already been located. If a stop coordinate is not known, the **Geocode** function can be used to get the coordinates for other stops and passed to this function.

Examples

<i>Two Stop Coordinates with Map</i>	
StopCoordinates	6491055,1897338;6486497,1841557
ShowRouteMap	true
Optimize	
Projection	
<i>Two Stop Coordinates in Geographic Projection with Map. For example, coordinates returned from Google Maps API.</i>	
StopCoordinates	-118.1,34.7;-118.2,34.8
ShowRouteMap	true
Optimize	
Projection	4326
<i>Multiple Stop Coordinates</i>	
StopCoordinates	6491055,1897338;6486497,1841557;6445455,1865716;6484458,1842272
ShowRouteMap	
Optimize	
Projection	
<i>Multiple Stop Coordinates with Optimization and Map</i>	
StopCoordinates	6491055,1897338;6486497,1841557;6445455,1865716;6484458,1842272
ShowRouteMap	true
Optimize	true
Projection	

<i>Two Addresses with Map in Geographic Projection</i>	
StopCoordinates	6491055,1897338;6486497,1841557
ShowRouteMap	true
Optimize	
Projection	4326

Service Response

Same as *RouteFromAddresses* function.

Known issues

Same as *RouteFromAddresses* function.

Data Sources

Same as *RouteFromAddresses* function.

Code Source

Same as *RouteFromAddresses* function.

GetMileage

Description	This service generates driving directions (route), total distance, total time, and optionally, a map from a list of addresses.
Location	http://gis.lacounty.gov/services/route.aspx?op=GetMileage
WSDL	http://gis.lacounty.gov/services/route.aspx?wsdl
Service History	1.0 February 2009

Mark Greninger

Parameters

Parameter	Usage
Addresses*	Semi-colon delimited List of Addresses

*required

Discussion

GetMileage function provides just the time and mileage information from the **RouteFromAddresses** function. It is designed to overcome certain XML string size limitations in HTTP GET commands, and to make mileage claim form development simpler. It uses the same functionality as the **RouteFromAddresses** function.

Examples

Examples

<i>Two Addresses</i>	
Addresses	222 S Hill St, 90012; 9150 E Imperial Hwy, 90242

<i>Multiple Addresses</i>	
Addresses	222 S Hill St, 90012; 3625 Sierra Vista Ave, Glendale, CA;9150 E Imperial Hwy, 90242; 9402 Via Yolanda, Burbank, CA;222 S Hill St, 90012

Service Response

Response Type XML String

Notes: None

Parameter	Description
<string> Driving distance: 16.9 mile(s),Driving time: 18 minute(s) </string>	Distance and time information

Known issues

Same as *RouteFromAddresses* function.

Data Sources

Same as *RouteFromAddresses* function.

Code Source

#	Description
1	ESRI – June 2008
2	ISD – February 2009 –Lokesh Shakya

Identify Services (identify.asmx)

GetDistrictInfofromLatLong & GetDistrictInfofromXY

Description These two services return a list of the most commonly requested Political Districts along with basic information:

- City or Community Name
- Supervisorial
- Congressional
- State Senate
- State Assembly
- State Board of Equalization

Location <http://gis.lacounty.gov/services/identify.asmx>

WSDL <http://gis.lacounty.gov/services/identify.asmx?wsdl>

Service History 1.0 November, 2007 for County Portal Mark Greninger

Parameters

Parameter	Usage
Longitude/X*	Longitude of point (GetDistrictInfofromLatLong) X Coordinate of point (GetDistrictInfofromLatLong) in State Plane Zone V
Latitude/Y*	Latitude of point (GetDistrictInfofromLatLong) Y Coordinate of point (GetDistrictInfofromLatLong) in State Plane Zone V

*required

Examples

<i>Latitude/Longitude (GetDistrictInfofromLatLong)</i>	
Longitude	-118.1
Latitude	34.1

X/Y Coordinates (GetDistrictInfofromXY)

X	6500000
Y	1800000

Service Response

Response Type XML Object: ArrayofDistrictDetail

Notes: Each service responds with the same information – a SOAP array containing DistrictDetail string objects.

Parameter	Description
<ArrayOfDistrictDetail>	Tag beginning an array of DistrictDetail Objects – currently 6
<DistrictDetail>	DistrictDetail Object tag – each response contains the same information below
<DistrictType>Supervisorial</DistrictType>	District Type describing the type of district being returned.
<DistrictNumber>4th</DistrictNumber>	The District Number
<Name>Don Knabe</Name>	District Representative's Name
<Street>500 W Temple St, Room 822</Street>	District Office Street Address
<City>Los Angeles</City>	District Office City
<State>CA</State>	District Office State
<Zip>90012</Zip>	District Office Zipcode
<Phone>(213) 974-4444</Phone>	District Office Phone Number
<Url>http://www.knabe.com/</Url>	District's Website URL
</DistrictDetail>	End Tag DistrictDetail Object tag
<ArrayOfDistrictDetail>	End Tag

Known issues

#	Description	Date	Resolution
1	No issues.		

Data Sources

Description

1	Political Districts are determined from the Registrar/Recorder's Precinct File
2	Political District information extracted from county and state websites.

Code Source

Description

1	CEO Urban Research (Lokesh Shakya) – November 2007
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Get??fromXY (multiple functions)

Description

This section covers a number of services, including:

- GetCTfromXY
- GetCityfromXY
- GetDMAfromXY
- GetSPAfromXY
- GetSupDistrictfromXY
- GetTBGridfromXY
- GetTBMapPagefromXY
- GetZipCodeFromXY

Location

<http://gis.lacounty.gov/services/identify.aspx?op=GetxxxfromXY>

WSDL

<http://gis.lacounty.gov/services/identify.aspx?wsdl>

Service History

1.0 October 2008

Mark Greninger

Parameters

Parameter	Usage
X*	X Coordinate of point (blank projection = State Plane Zone V)
Y*	Y Coordinate of point (blank projection = State Plane Zone V)
Projection	Numeric projection code defining the coordinate system (projection) of the input output results: Blank = 102645 (default) : State Plane Zone 5 4326 is the most commonly used code, returning Geographic Coordinate (i.e. -118, 34) for overlay on commercial mapping APIs. For more projection codes, see: http://edndoc.esri.com/arcims/9.0/ - click on the "Coordinate IDs and Description"

*required

Examples

X/Y Coordinates	
X	6500000
Y	1800000
Projection	

Latitude/Longitude	
Longitude	-118.1
Latitude	34.1
Projection	4326

Service Response

Response Type XML Object: IdentifyResult

Notes: Each service responds with the same information – a SOAP object containing a single FIELD/VALUE pair

Parameter	Description
<IdentifyResult>	
<FeatureCount>1</FeatureCount>	Number of features returned – always 1
<Features>	Array of Feature Objects (always 1 feature -maintains consistency with back end)
<Feature>	Feature Tag
<Attributes>	Attributes Array – always 1 attribute
<Attribute>	First Attribute
<Field>ZIPCODE</Field>	Field Name from Data Source (this example from <i>GetZipCodefromXY</i>)
<Value>90280</Value>	Field Value from Data Source (this example from <i>GetZipCodefromXY</i>)
</Attribute>	End Tag
</Attributes>	..
<Feature>	..
<Features>	..
<IdentifyResult>	..

Discussion

This section covers a number of functions developed to perform a basic function of Geographic Information Systems – “where am I?” Each function takes the input parameter, a set of coordinates, and returns a single **field**/value pair with information about a boundary they are inside. For example, the ***GetZipcodeFromXY*** function returns the zipcode, the ***GetSPAfromXY*** returns the SPA (Service Planning Area).

These functions rely on a generalized back-end function called **GenericIdentify** which allows new functions to be implemented very quickly upon request. The functions have been designed so that code does not need to be changed on both our servers and required minimal change for developers since ALL response tags are the exactly the same. If you need a specific function, contact the ISD Enterprise GIS Team.

Known issues

#	Description	Date	Resolution
1	No issues.		

Data Sources

#	Description
1	Data Sources are available from the Enterprise GIS Data List

Code Source

#	Description
1	ISD Enterprise GIS Group - (Mark Greninger & Lokesh Shakya) – November 2008