Adding Geocoded Information to Your Apps

ComponentOne®

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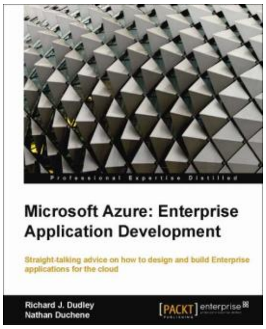


Professional Expertise Distilled

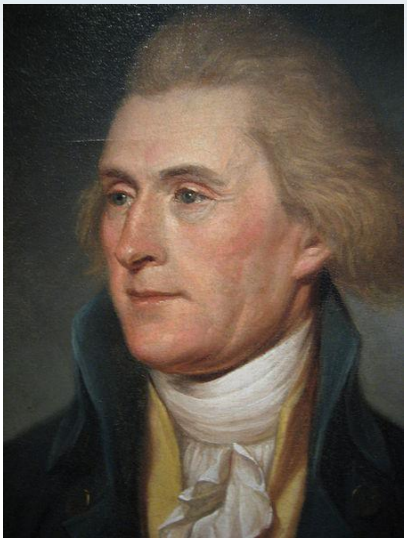
Microsoft Azure: Enterprise Application Development

Straight-talking advice on how to design and build Enterprise applications for the cloud

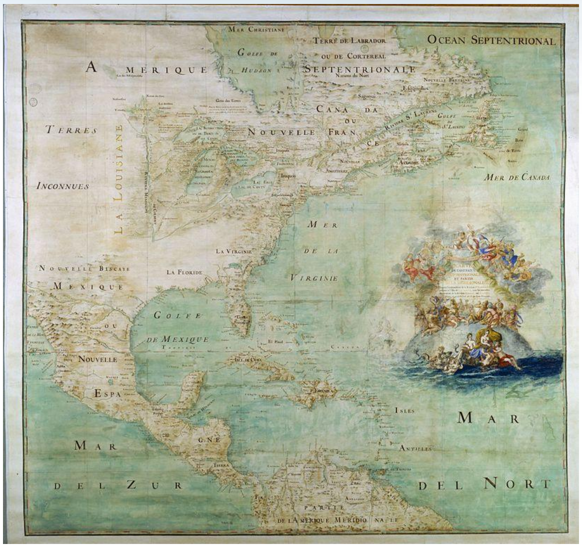
Richard J. Dudley
Nathan Duchene

[PACKT] enterprise

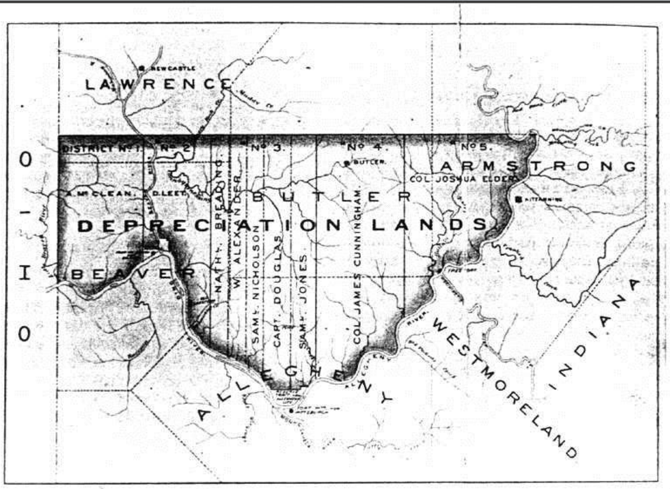
Thomas Jefferson



I have some land in…


AMERIQUE
OCEAN SEPTENTRIONAL
TERRE DE LABRADOR
SEPTENTRIONALE
CANADA
NOUVELLE FRANCE
TERRES
INCONNUES
LA LOUISIANE
MER DE CANADA
MER DE LA VIRGINIE
LA VIRGINIE
LA FLORIDE
NOUVELLE BISCAYE
MEXIQUE
GOLFE DE MEXIQUE
NOUVELLE ESPA
ISLES
ANTILLES
MAR DEL ZUR
MAR DEL NORT

Depreciation Lands

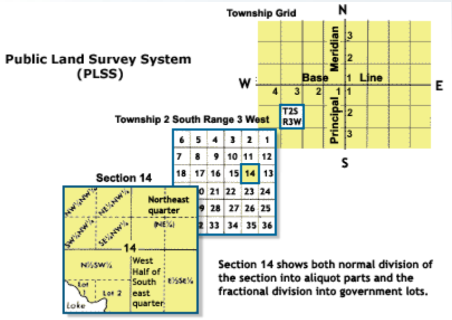

NEWCASTLE
LAWRENCE
DISTRICT No. 1
No. 2
No. 3
No. 4
No. 5
BUTLER
ARMSTRONG
COL. JOSHUA ELDER
KITTANNING
A. McCLEAN
D. LEET
BUTLER
DEPRECIATION LANDS
NATH'Y. BREADING
W. ALEXANDER
SAM'L NICHOLSON
CAPT. DOUGLAS
SAM'L JONES
COL JAMES CUNNINGHAM
BEAVER
OHIO
ALLEGHENY
WESTMORELAND
INDIANA

Map 5. The five surveying districts of the Depreciation Lands superimposed over current counties. (Pennsylvania Department of Internal Affairs *Annual Report of the Secretary of Internal Affairs*, 1892)

Metes and Bounds

From the point on the north bank of Muddy Creek one mile above the junction of Muddy and Indian Creeks, north for 400 yards, then northwest to the large standing rock, west to the large oak tree, south to Muddy Creek, then down the center of the creek to the starting point.

Public Land Survey System

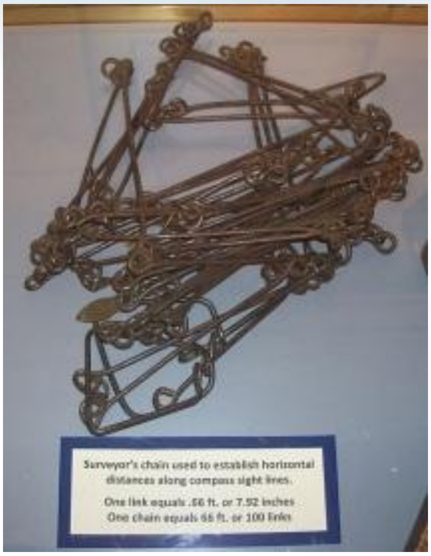

Public Land Survey System
(PLSS)
Township Grid
N
W
E
S
Base
Line
Principal
Meridian
3
2
1
1
2
3
4
3
2
1
T2S
R3W
Township 2 South Range 3 West
6 5 4 3 2 1
7 8 9 10 11 12
18 17 16 15 14 13
0 21 22 23 24
9 28 27 26 25
2 33 34 35 36
Section 14
NW¼NW¼
NE¼NW¼
SW¼NW¼
SE¼NW¼
Northeast quarter
(NE¼)
14
N½SW¼
Lot 1
Lot 2
Lake
West Half of South east quarter
E½SE¼

Section 14 shows both normal division of the section into aliquot parts and the fractional division into government lots.

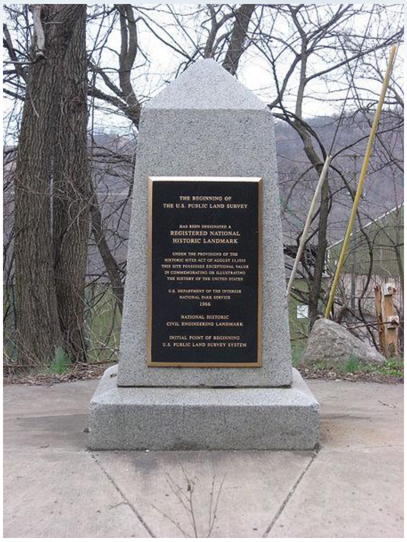
“Fort Blunder”

- Built in New York in 1816 to protect from a British invasion from Canada
- 45th parallel in an early survey in the wrong place
- Ft. Blunder actually built in Canada
- Abandoned, and Fort Montgomery built ¾ mile to the south
- That awkward moment when diplomats earn their pay...

Where did they go wrong?


Surveyor's chain used to establish horizontal distances along compass sight lines.
One link equals .66 ft. or 7.92 inches
One chain equals 66 ft. or 100 links

So what's the point?


THE BEGINNING OF
THE U.S. PUBLIC LAND SURVEY
HAS BEEN DESIGNATED A
REGISTERED NATIONAL
HISTORIC LANDMARK
UNDER THE PROVISIONS OF THE
HISTORIC SITES ACT OF AUGUST 21,1935
THIS SITE POSSESSES EXCEPTIONAL VALUE
IN COMMEMORATING OR ILLUSTRATING
THE HISTORY OF THE UNITED STATES
U.S. DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
1966
NATIONAL HISTORIC
CIVIL ENGINEERING LANDMARK
INITIAL POINT OF BEGINNING
U.S. PUBLIC LAND SURVEY SYSTEM

Why geocode?

- Crime
- Wildlife management
- GeoBI
- Social games
- Location aware apps (HTML 5 geolocation)
- Calculate routes and rates
- Etc.

Geocoding Services

- ESRI
- Bing
- Lat/Long database

- Google has recently changed its TOS

When to geocode?

- On entry
- Nightly batch (SSIS)

- Don’t be chatty
- Asynchronous batches for lots of data

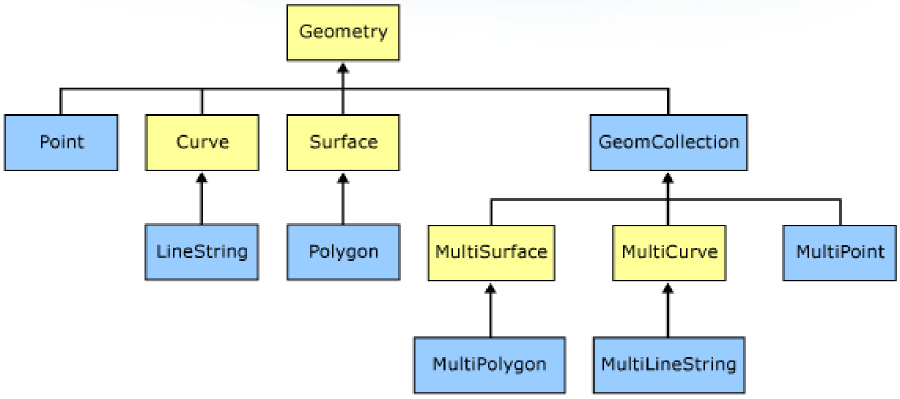
Spatial Types in SQL Server 2008

- Introduced in SQL Server 2008
- Geometry and geography types

- Latitude and longitude are doubles
- Do NOT store as float, use decimal or varchar

- SQL Server 2008 Feature Pack for reusable library

Points, lines and polygons


Geometry
Point
Curve
Surface
GeomCollection
LineString
Polygon
MultiSurface
MultiCurve
MultiPoint
MultiPolygon
MultiLineString

SQL Syntax

- Create a new point

```
DECLARE @g geography;
SET @g = geography::STGeomFromText('POINT(-122.34900 47.65100)', 4326);
```

- Return the latitude

```
SELECT @g.Lat;
```

- Query

```
select * from Locations
where LatLon.STEquals(geography::STPointFromText('Point(-79.94
40.86)',4326))= 'true‘
```

- Method reference: http://msdn.microsoft.com/en-us/library/bb933802(v=SQL.100).aspx

What are we going to do?

- Look at database
- Make a proxy class from Bing service
  - Svcutil.exe or slsvcutil.exe
- Simple web form to get lat/long
- Store in database

- From here..
  - Display on a map
  - Analyze!

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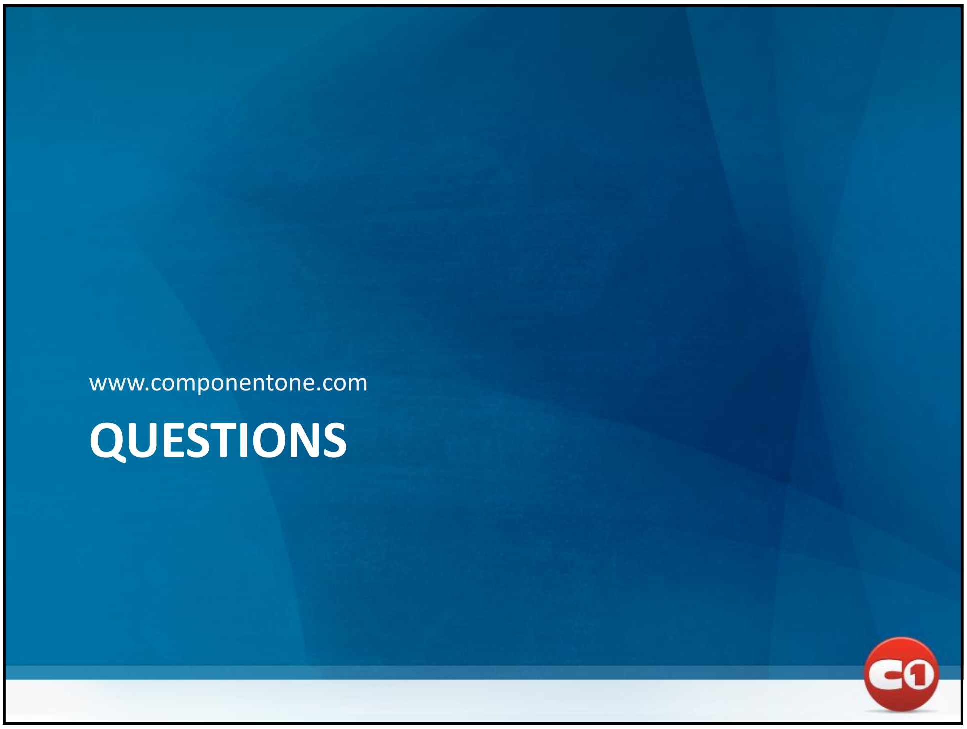
DEMO



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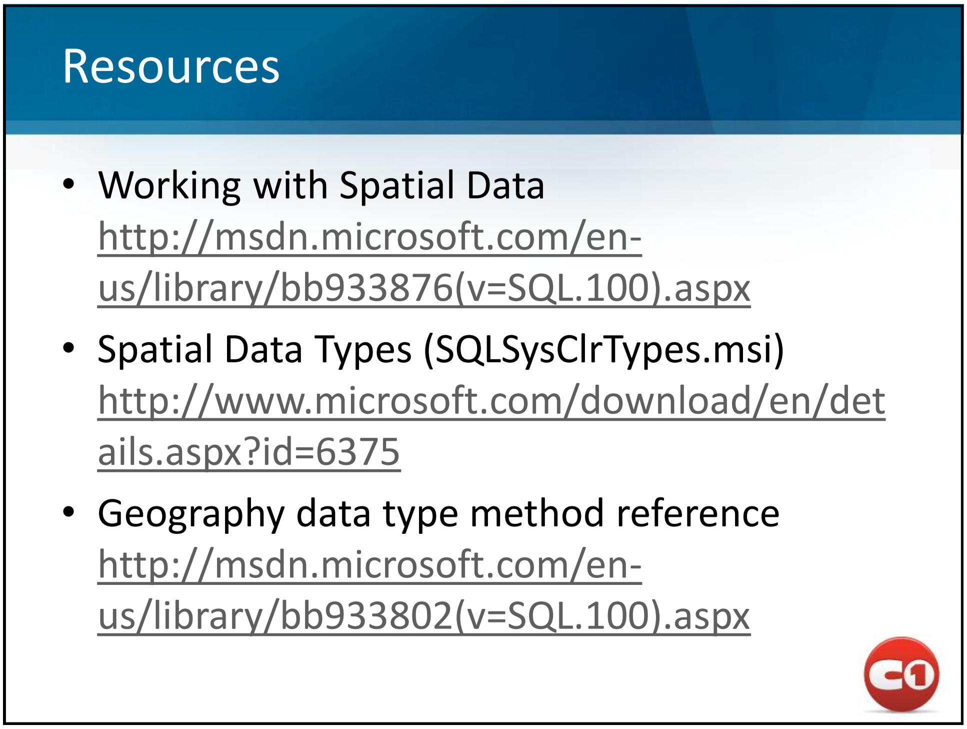
QUESTIONS



Resources

- Working with Spatial Data http://msdn.microsoft.com/en-us/library/bb933876(v=SQL.100).aspx
- Spatial Data Types (SQLSysClrTypes.msi) http://www.microsoft.com/download/en/details.aspx?id=6375
- Geography data type method reference http://msdn.microsoft.com/en-us/library/bb933802(v=SQL.100).aspx

The Info-Tech Application Development Components & Tools Vendor Landscape

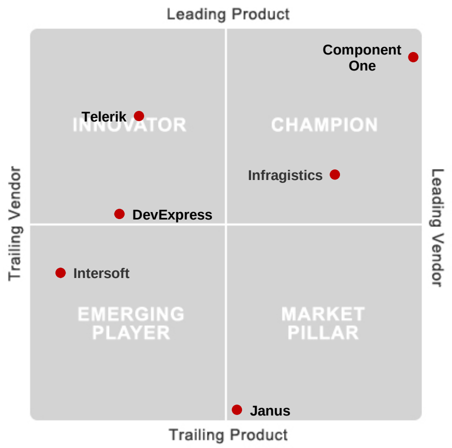
Champions receive high scores for most evaluation criteria and offer excellent value. They have a strong market presence and are usually the trend setters for the industry.

Market Pillars are established players with very strong vendor credentials, but with more average product scores.

Innovators have demonstrated innovative product strengths that act as their competitive advantage in appealing to niche segments of the market.

Emerging Players are newer vendors who are starting to gain a foothold in the marketplace. They balance product and vendor attributes, but score lower relative to market Champions.

For a complete description of Info-Tech's Vendor Landscape methodology, see the Appendix.



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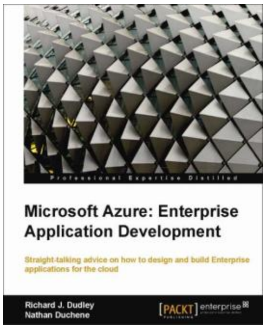
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