How Shifting IT Trends are Affecting Geospatial Professional Workforce Development

April 24-26, 2012

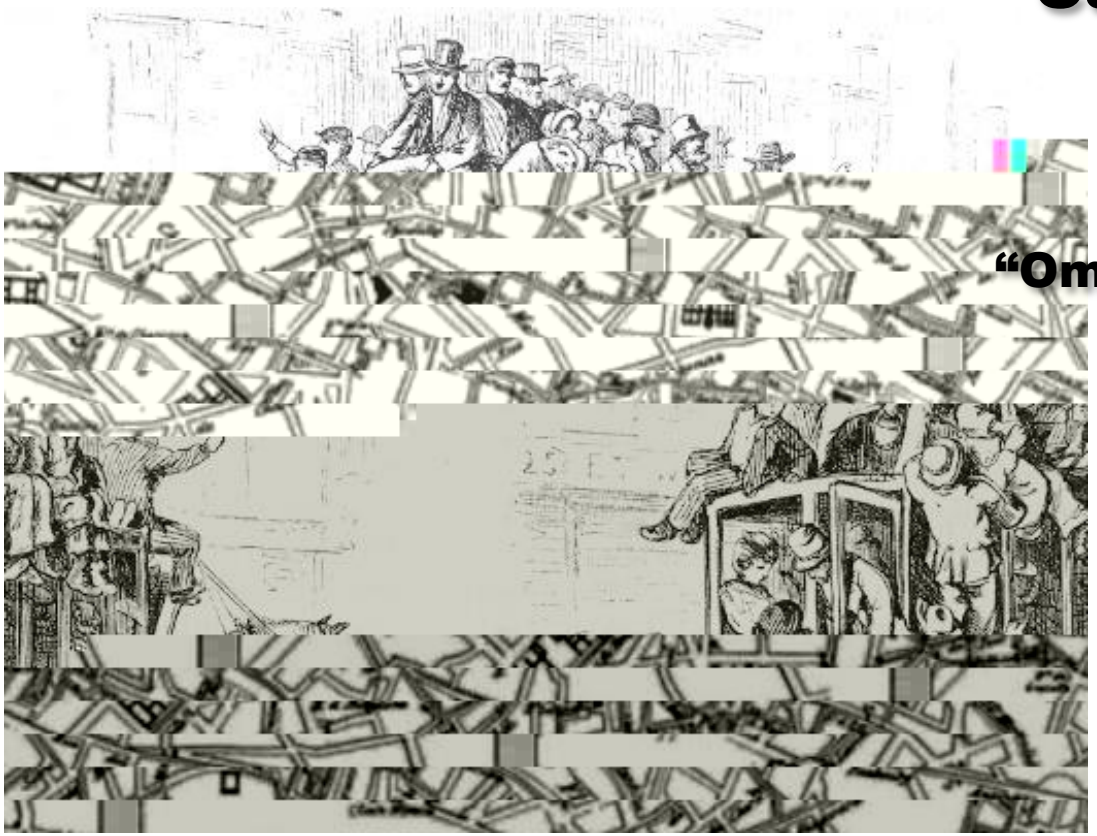


Greg Ferrara
Program Manager
Visual Analytics Modeling and Simulation (VAMS)
Institute for Transportation Research and Education (ITRE)
North Carolina State University
Raleigh, NC

ITRE
NC STATE UNIVERSITY

First Public Bus

ca. 1662



“Omnibus” = All

Source: Wikipedia.org

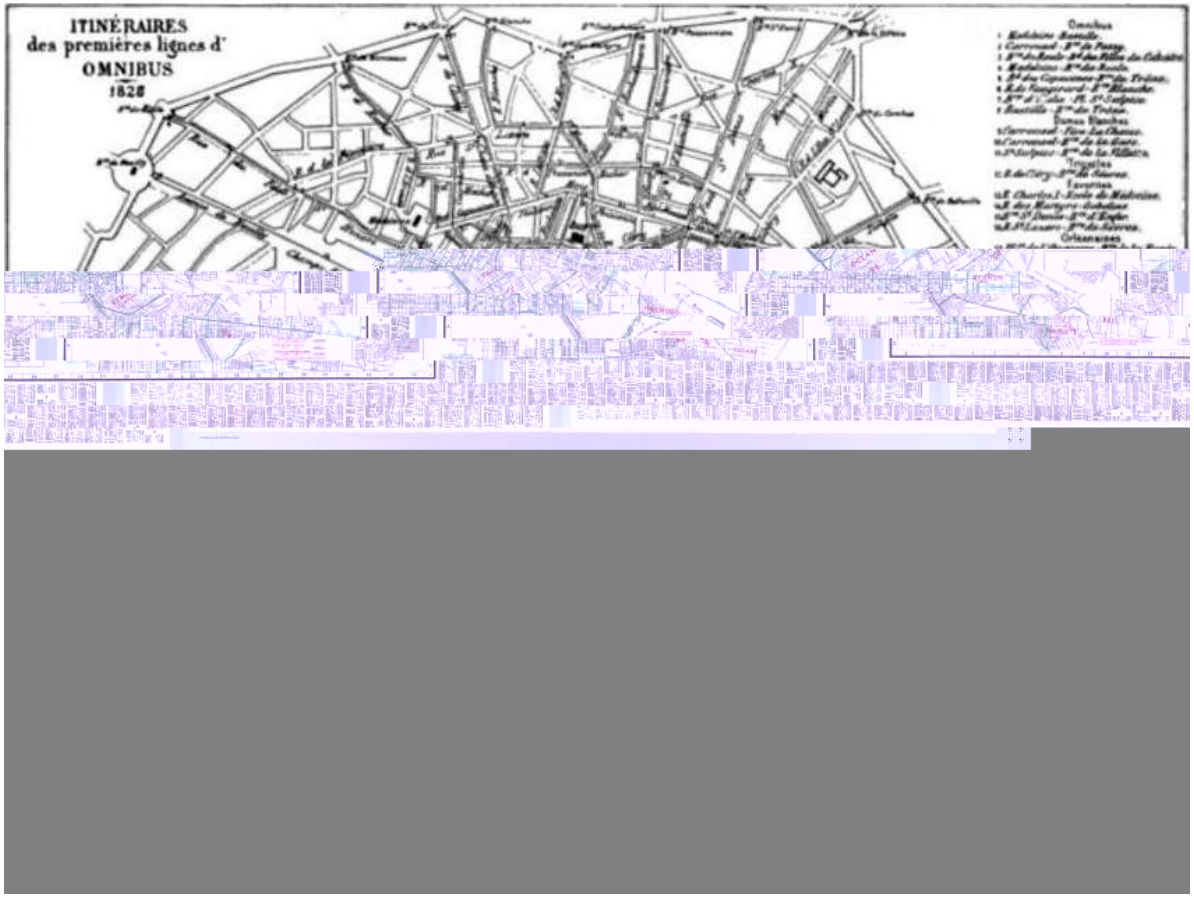
Parisian Omnibus

ca. 1826



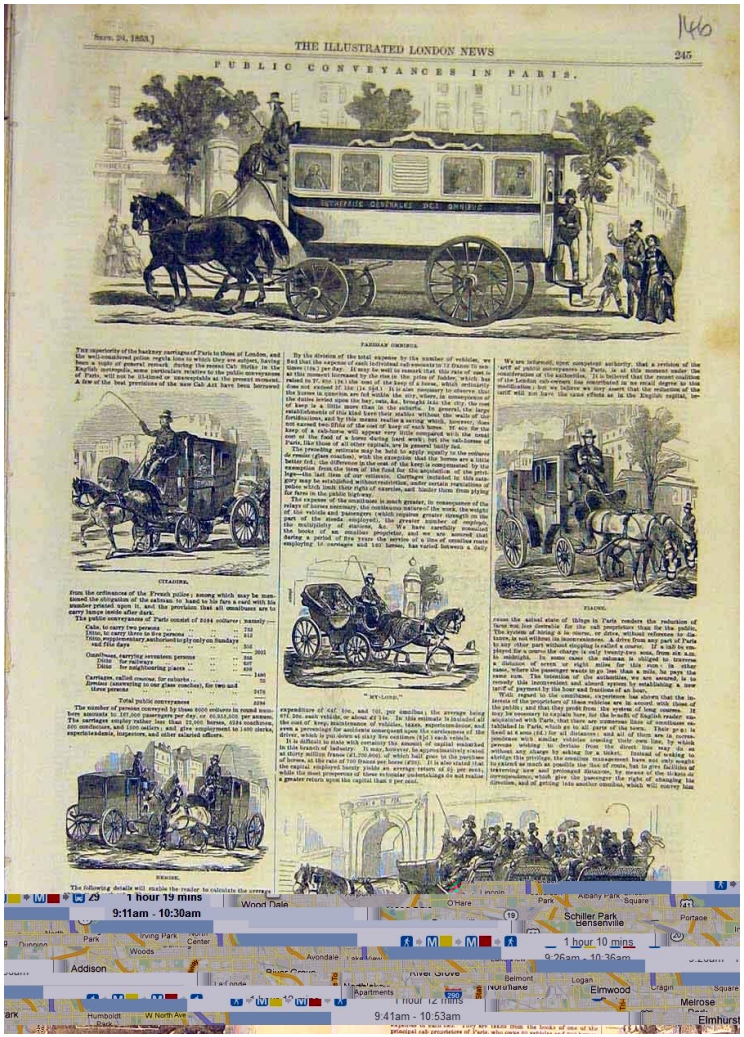
Source: oldbaileyonline.org

1828
Omnibus Map



Source: skyscrapercity.com/showthread.php?t=1465629

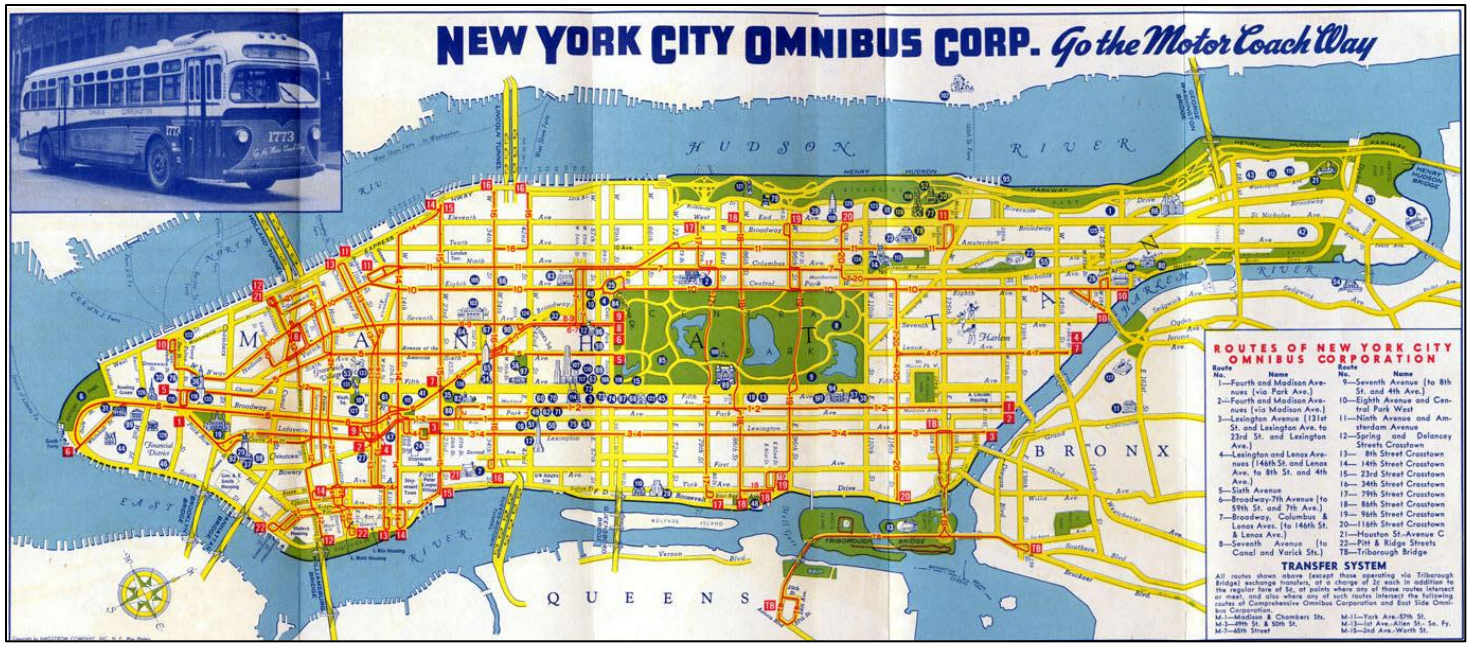
1853
Public Conveyances



1928
Los Angeles Transit Map



1940
NYC Bus Map



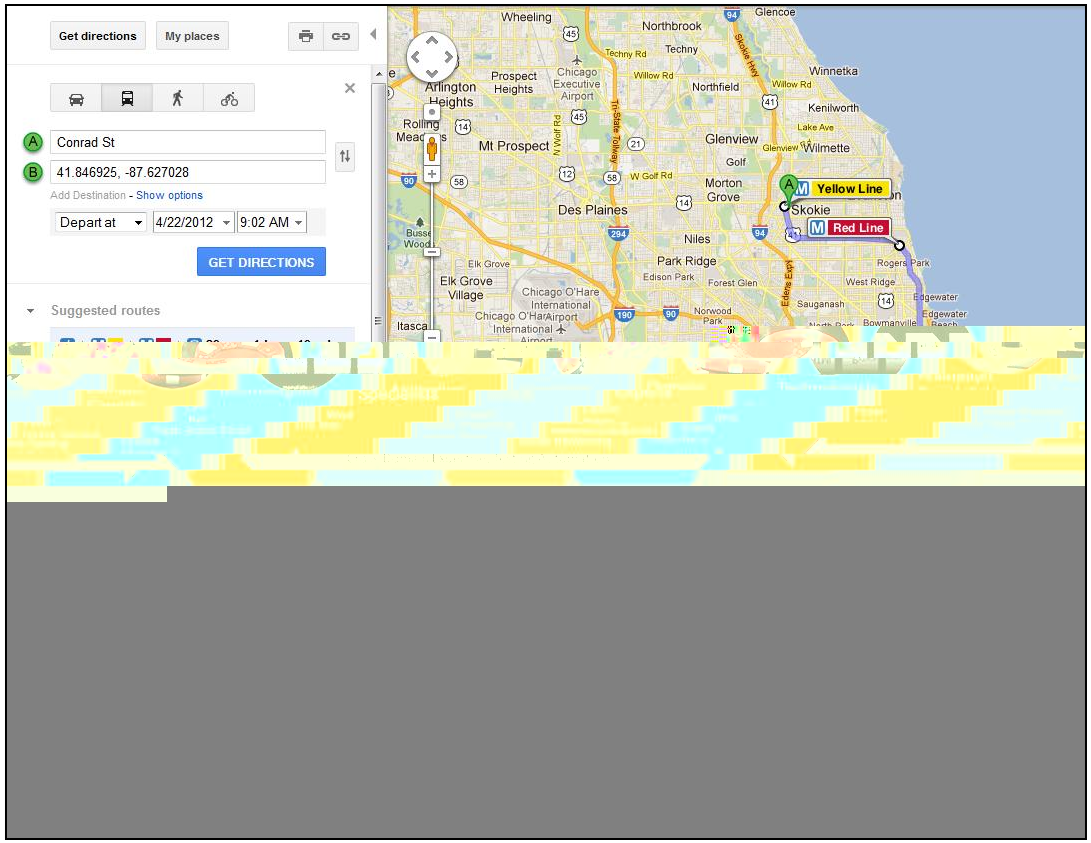
1960
Moscow Bus Map



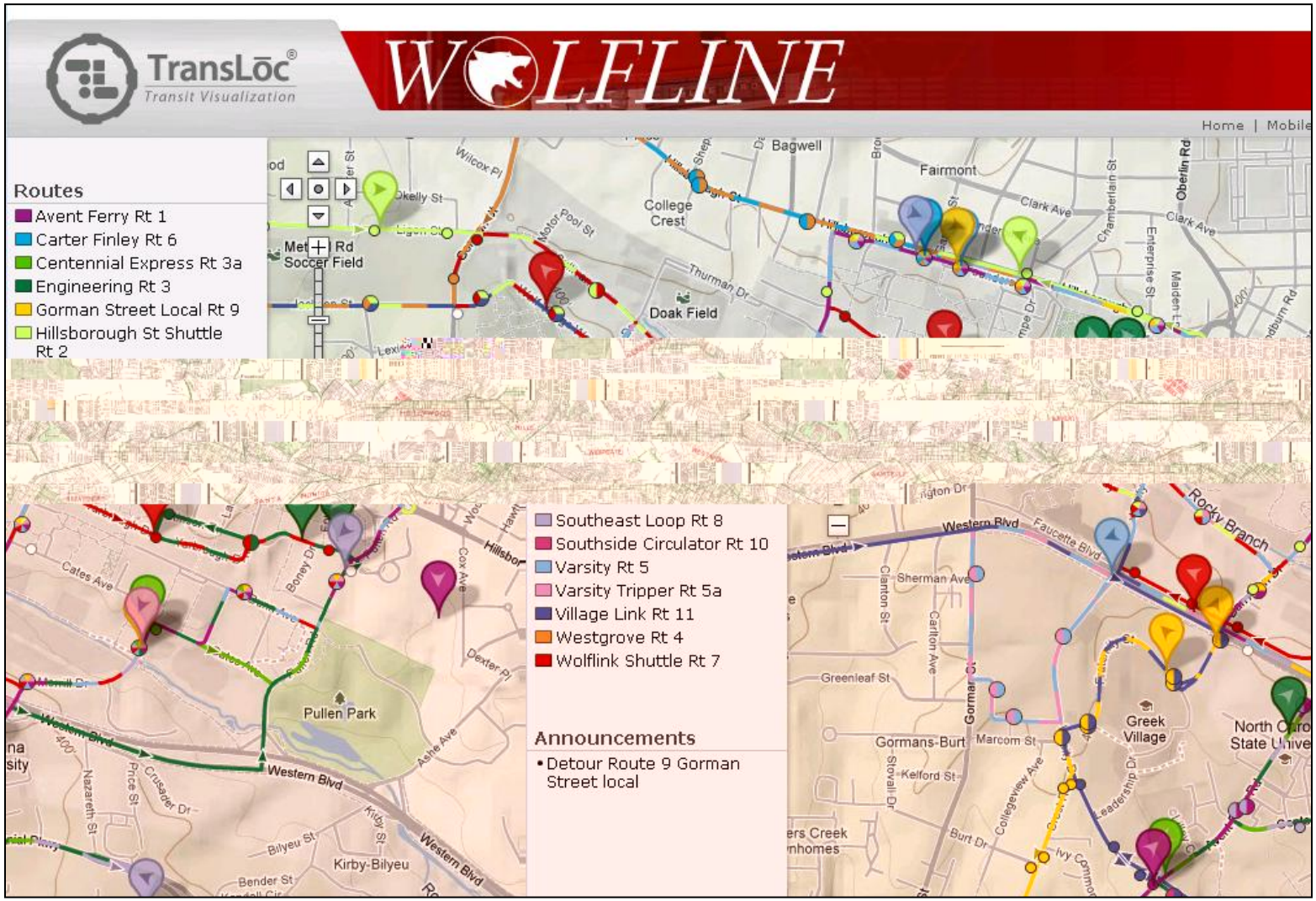
2012
Chicago Bus Map



2012


Get directions
My places
Conrad St
41.846925, -87.627028
Add Destination - Show options
Depart at
4/22/2012
9:02 AM
GET DIRECTIONS
Suggested routes
Wheeling
Northbrook
Glencoe
Techny
Prospect Heights
Chicago Executive Airport
Arlington Heights
Winnetka
Northfield
Kenilworth
Rolling Meadows
Mt Prospect
Glenview
Wilmette
Golf
Morton Grove
Yellow Line
Skokie
Red Line
Des Plaines
Niles
Park Ridge
Elk Grove Village
Chicago O'Hare International Airport
Rogers Park
West Ridge
Edgewater
Norwood Park
Sauganash
Itasca

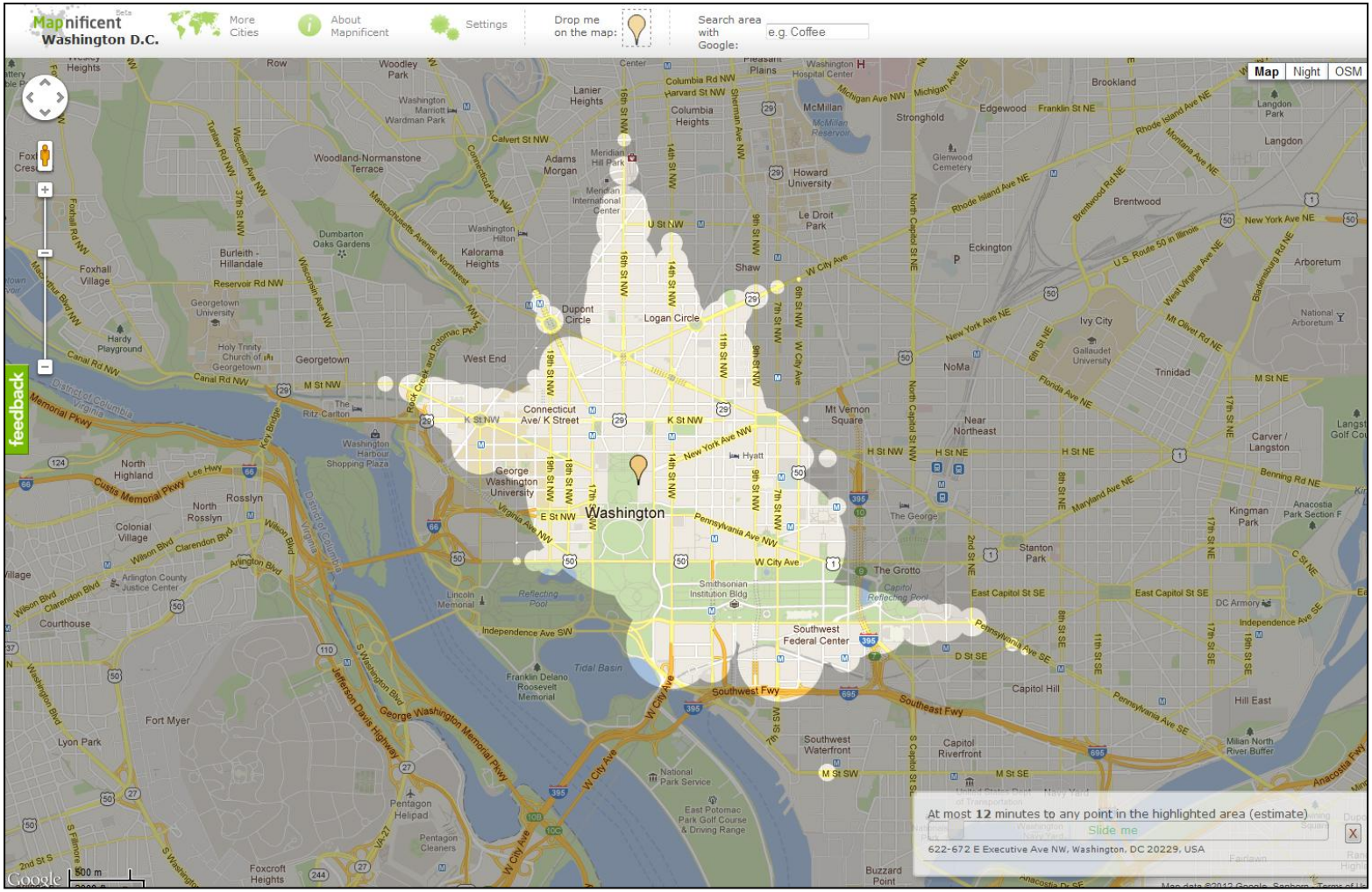
Wolfline Map



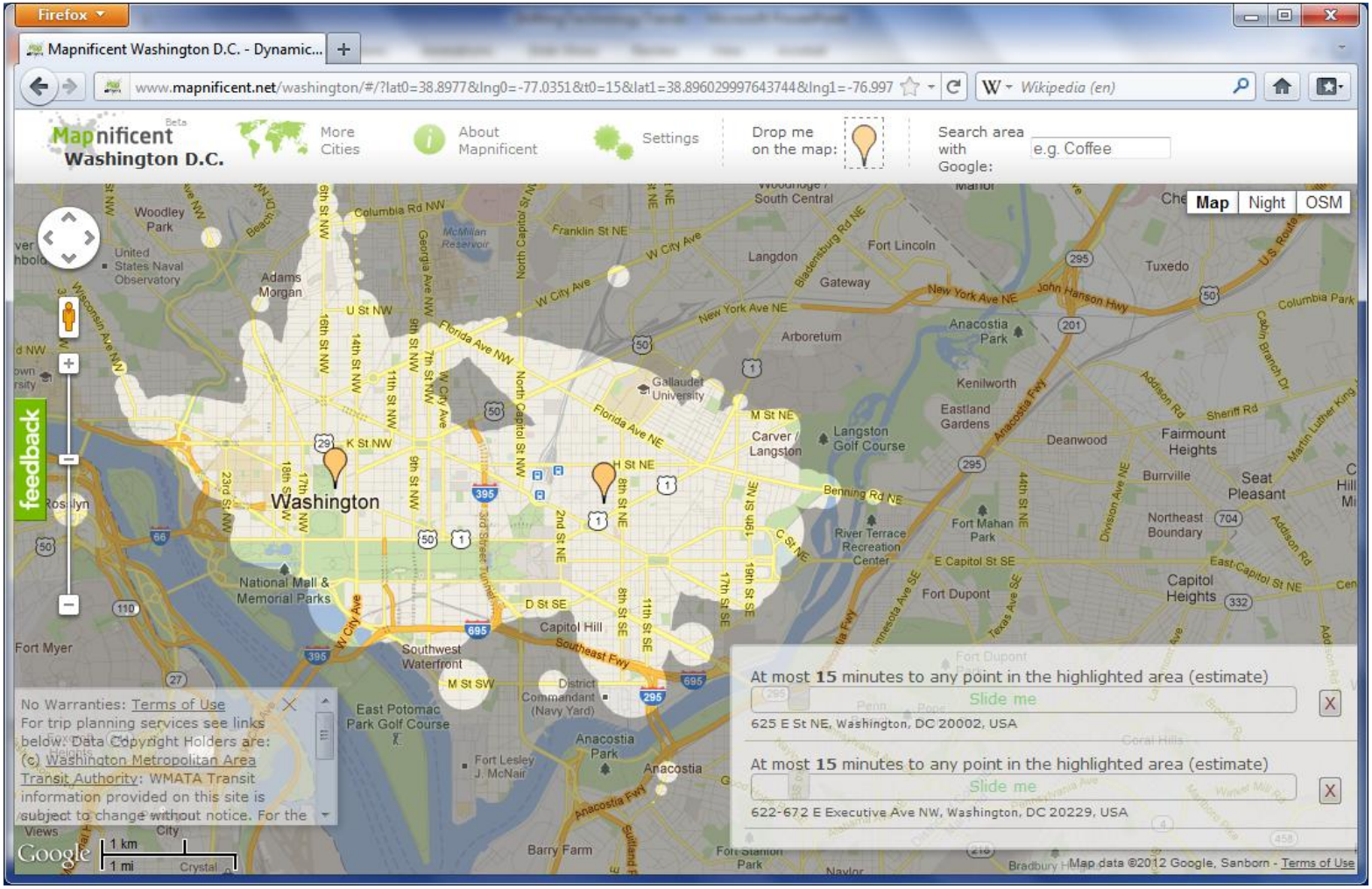
Tap to Pay



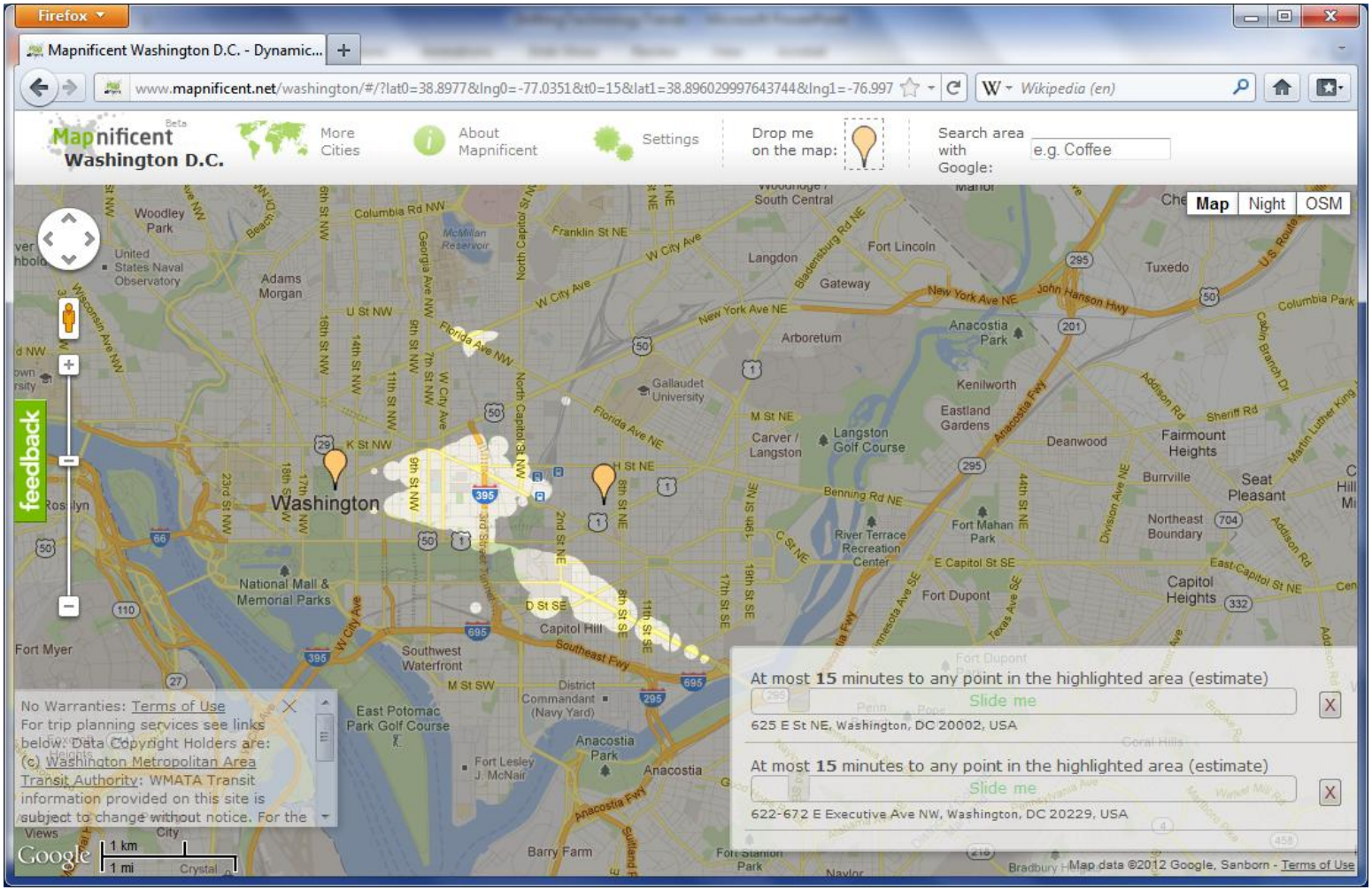
Mapnificent.net



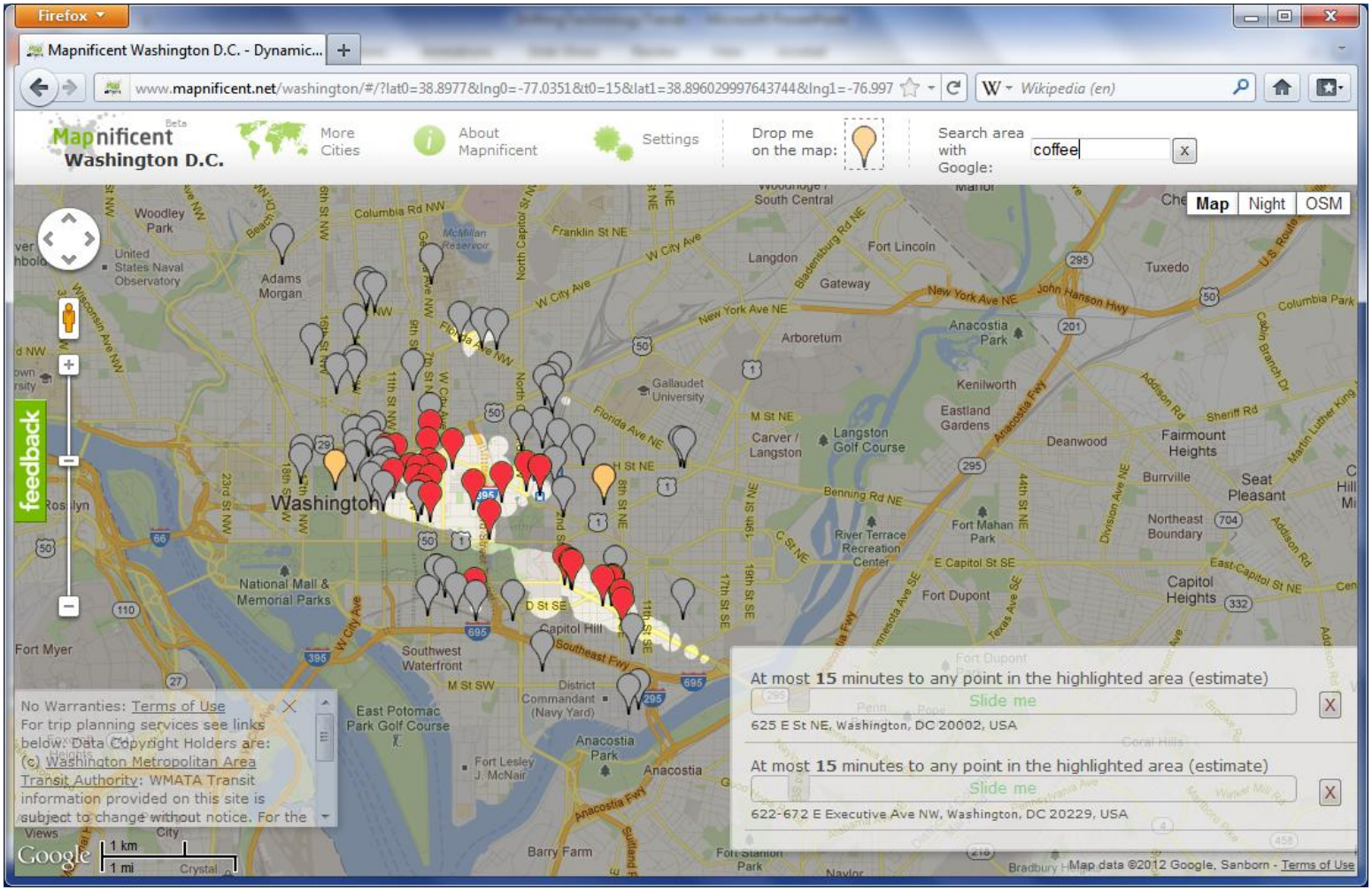
Drop a Pin


Firefox
Mapnificent Washington D.C. - Dynamic...
www.mapnificent.net/washington/#/?lat0=38.8977&lng0=-77.0351&t0=15&lat1=38.896029997643744&lng1=-76.997
Wikipedia (en)
Mapnificent
Beta
Washington D.C.
More Cities
About Mapnificent
Settings
Drop me on the map:
Search area with Google:
e.g. Coffee
Map
Night
OSM
feedback
Washington
At most 15 minutes to any point in the highlighted area (estimate)
Slide me
625 E St NE, Washington, DC 20002, USA
At most 15 minutes to any point in the highlighted area (estimate)
Slide me
622-672 E Executive Ave NW, Washington, DC 20229, USA
No Warranties: Terms of Use
For trip planning services see links below. Data Copyright Holders are:
(c) Washington Metropolitan Area Transit Authority: WMATA Transit information provided on this site is subject to change without notice. For the
Google
1 km
1 mi
Map data ©2012 Google, Sanborn - Terms of Use

Click Intersect

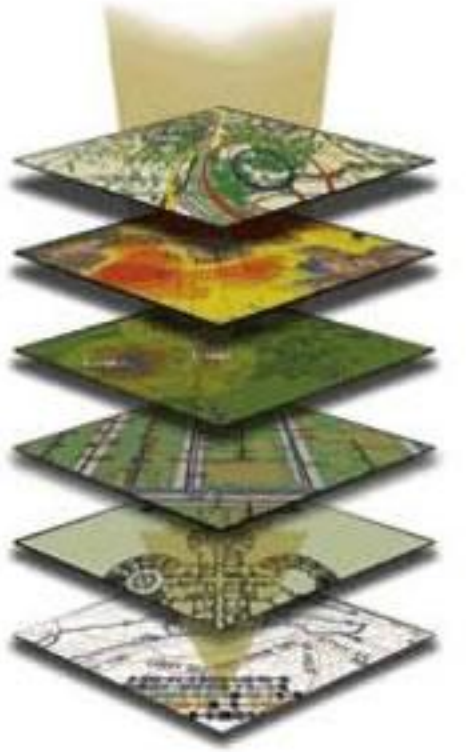


Type in Coffee



Agenda

- GIS Example
- How has IT shifted?
- Shifting GIS Career paths
- What degrees / skillsets / competencies / curricula are needed?
- Concluding Remarks



Why GIS?



Location

Most/all technology systems have a **location component**



I Do



Technology Trends?



Then and Now

Old Model







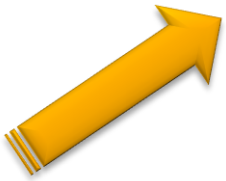




Hardware

Software

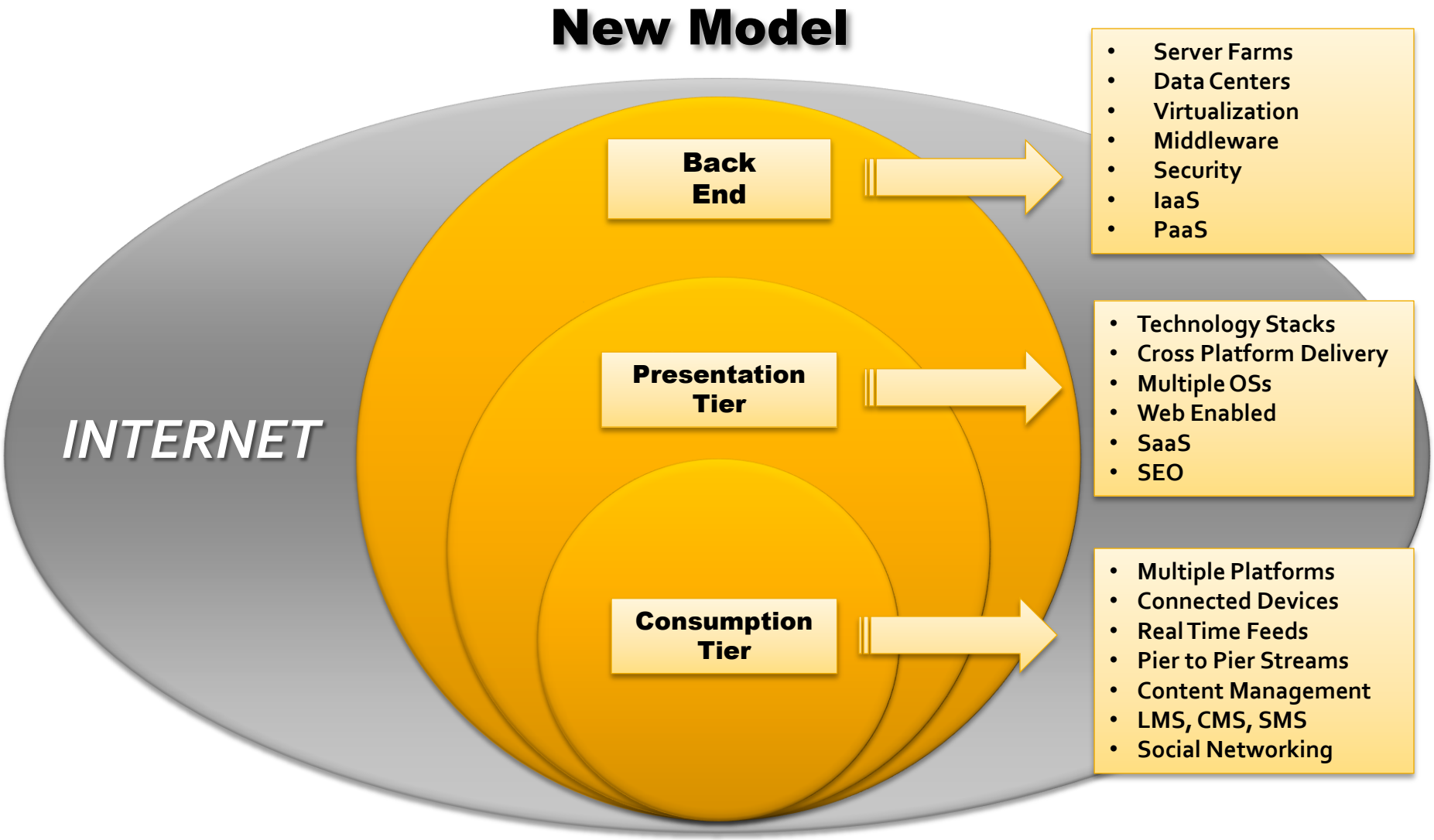
Users



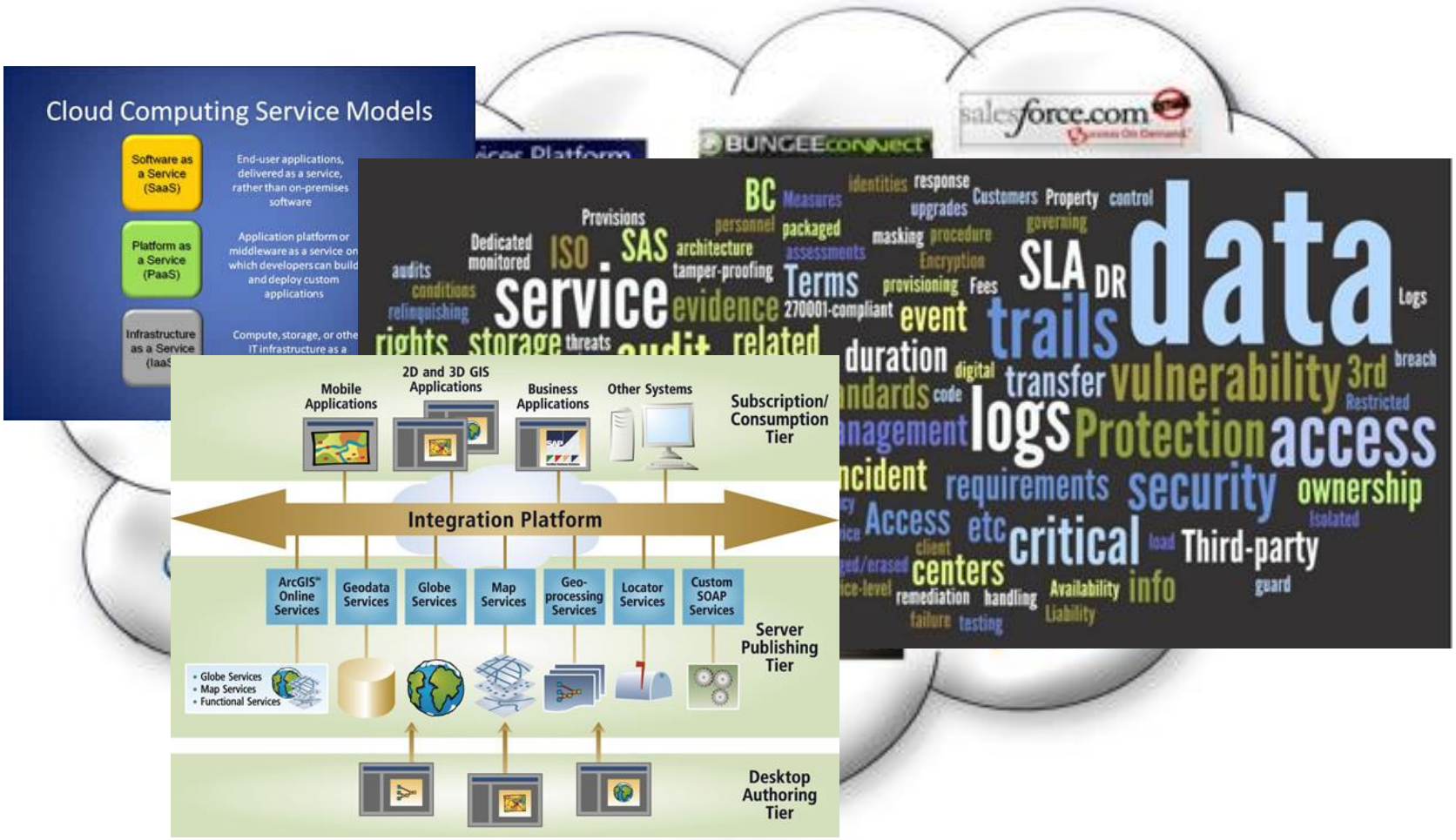
"The World Wide Web"



Then and Now


New Model
INTERNET
Back End
Presentation Tier
Consumption Tier
• Server Farms
• Data Centers
• Virtualization
• Middleware
• Security
• IaaS
• PaaS
• Technology Stacks
• Cross Platform Delivery
• Multiple OSs
• Web Enabled
• SaaS
• SEO
• Multiple Platforms
• Connected Devices
• Real Time Feeds
• Pier to Pier Streams
• Content Management
• LMS, CMS, SMS
• Social Networking

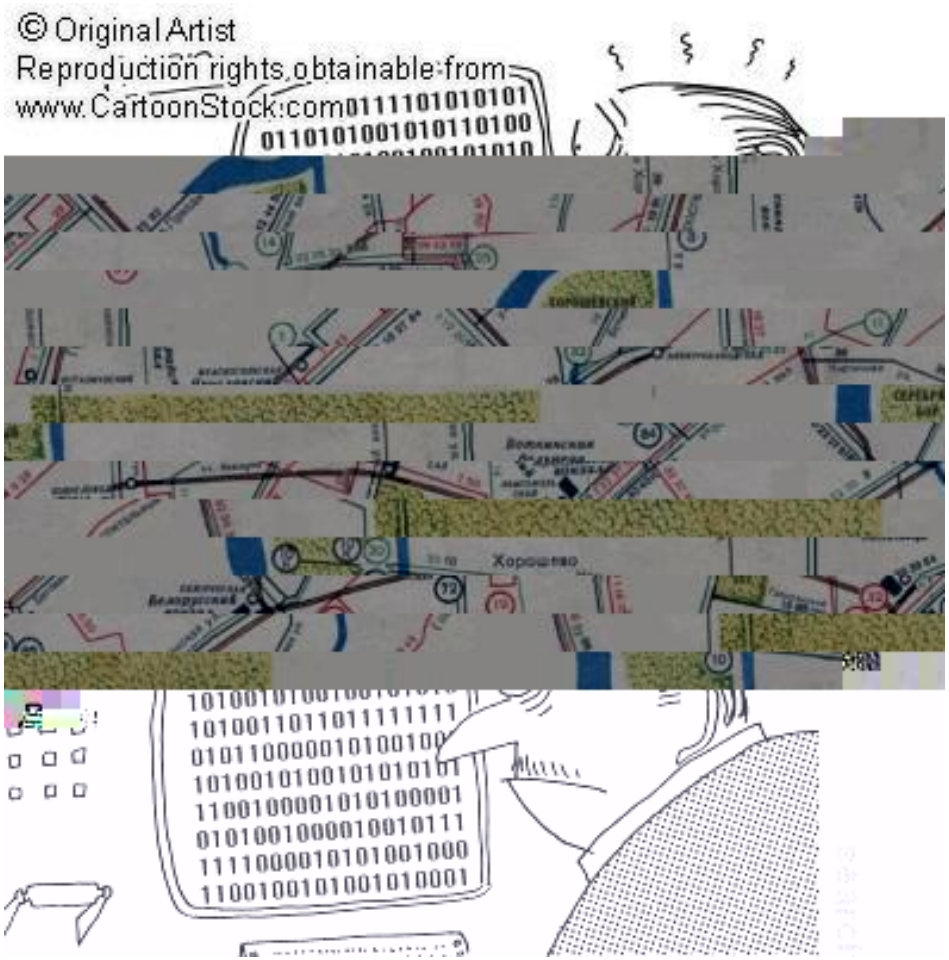
What Does This Mean?



Real Progress?

Then

Now



#2 --Specialty skillsets added to

- **Specialty Niches**
- **Multiple skillsets**
- **Certification**



Data Visualization Specialists / Information Visualizer

Key Responsibilities

A full listing of Data Visualization responsibilities would include the following:

Providing value-add analysis to Business through use of visualization software to guide analysis, drawing implications from analysis, and synthesizing into clear communications

Understanding how data flows within various systems to provide input on requirements for databases to ensure data is organized properly for reporting/analytics

Working closely with Data Quality teams to ensure data integrity & completeness

Developing business requirements to drive functional specifications for reporting applications

Working with business and cross-functional teams to thoroughly document reporting processes and systems

The acquisition, management, and documentation of data (including geo-spatial data)

Working with clients / client service teams to plan and carry out data analyses

Participating in proposal writing, client deliverables and research papers

Creating visualizations from data / GIS data analysis for inclusion in proposals, reports, papers and multi-media projects

Primary job functions can vary according to role and specific country recruiting needs, and successful candidates are likely to have a selection of skills, with deep experience in two or more of these areas.

Qualifications

Education and Qualifications

Data Visualization specialists will come from diverse backgrounds:

Some may have degrees (or advanced degrees) in a relevant discipline from a top school. Preferably in Operations Research, Applied Mathematics, Industrial Engineering, Computer Science.

However, a Data Visualization team also needs individuals with qualifications in design, multi-media design, animation and interactive media.

The ideal candidate would have a **combination of these qualifications**.

Experience Required

We would be interested in speaking with candidates at all levels of experience (2+ years relevant work experience and beyond). At the highest level applicants would have backgrounds along the following lines:

Minimum of 5 years related work experience (depends on level)

For example: Data Visualization, Analytics, Operations Strategy, Decision Support and/or Data Management.

Proven experience in information technology.

A track record which demonstrates an understanding of which visualisation method to use in which scenario to present the data in an ideal way.

Outstanding written, verbal, and presentation skills

Skilled in data retrieval, data management, data modelling.

Working knowledge of data warehouse systems.

Strong business analysis skills, particularly around requirements gathering including facilitation, interviewing, and communication skills

Data Visualization Specialists / Information Visualizer

Key Competencies or Skills Required to Undertake the Role

The ability to work with large and complex data sets with a clear understanding of the full data ecosystem from source to the presentation layer:

Strong analytical skills and quantitative techniques

Strong knowledge of Mathematical / Statistical modelling

Expert in mathematical modelling and statistical analysis

Proficiency in SQL, SQL*Plus, Oracle, Teradata, UNIX, DTS/SSIS

Strong data analysis skills with the ability to use MS Excel, Access and other desktop products to prototype and present results

Experience with statistical analysis and visualization software such as SAS, JMP, R, Tibco Spotfire, Tableau

Experience with the open-source tools "Processing" and "d3.js".

Hands-on experience with Data Query Business Intelligence Software (Business Objects, Cognos, Endeca)

Familiarity with enterprise data systems and databases with experience in analysing large, complex volume data sets (Big Data)

Experience developing or assisting the creation of a data warehouse or data mart, including data modelling and architecture

Understanding of Dashboards that are common across most industries, and the range of visualisation methods used (e.g. bar chart, streamgraph, heatmap, treemap, etc).

Knowledge of Flash, Visual Basic and HTML/Javscript based visualisation services and software libraries (such as Protovis, Tableau Software, Roambi, Google Charts, Fusion Charts)

Knowledge of scripting language is a plus.

Personal Attributes

A "do-er" and self-starter who works well in a fast-paced, dynamic, team-oriented environment.

Highly responsive and adaptable to efficiently manage quick-turn, tactical projects.

Skilled at exercising **cross-functional influence** between business owners and technical teams.

Concluding Remarks

- Consider ***funding research*** that systematically identifies technology training needs for specific domains (i.e. high speed rail)
  - California example http://transweb.sjsu.edu/project/1027.html

Concluding Remarks

- Consider *adding technology categories* and/or enhancing existing training categories for training offered by:
  - Transportation Safety Institute
  - National Highway Institute
  - National Transit Institute (already has some)

Concluding Remarks

- **Consider vendor "*partner IT injections*" into education facilities**

  (i.e. Adobe, Microsoft, Google, etc.)

  - **University level curriculums**
  - **Technical / Community Colleges**
  - **UTCs and/or University Education Institutions**

  - **E.g. Volvo / NC State University**

Contact

Greg Ferrara
Program Manager
Visual Analytics Modeling and Simulation (VAMS)
Institute for Transportation Research and Education (ITRE)
North Carolina State University
Raleigh, NC

itre.ncsu.edu
gpferrar@ncsu.edu
919.515.8656