



Map.Harvard.Edu

The 21st Century Harvard Map

www.map.harvard.edu/mapserver/campusmap.htm

NEARC

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Harvard University Planning Office

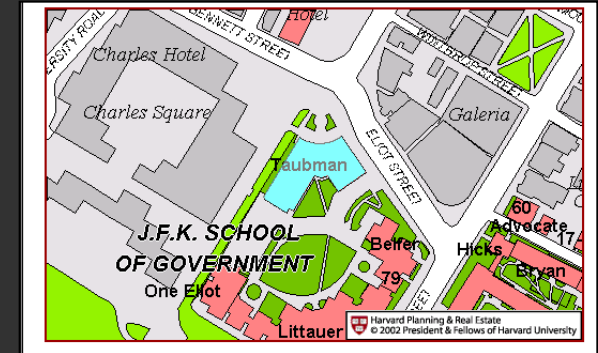
peter_siebert@harvard.edu



The Harvard On-line Map: first 10 years

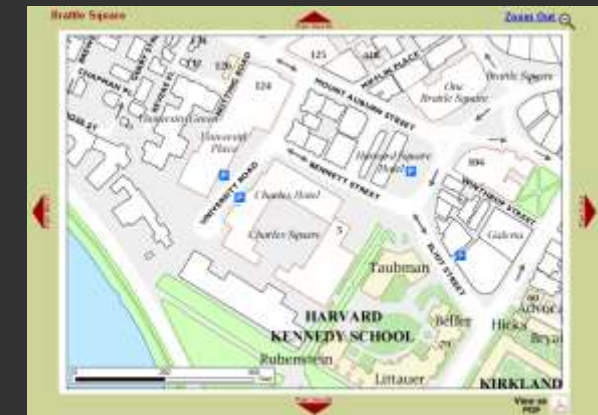
Initial Web Mapping - 1997

- AutoCAD + Autodesk MapGuide Server
 - Full functionality: navigation, zoom, roll-overs
 - Complicated map authoring
 - Required plug-in



Current Harvard Map — 2003 to present

- Cold Fusion back end for navigation and database
- Simulated interactivity
- Image tiles: ArcMap >PDF >Adobe Illustrator >GIF



Choosing a new platform

Why not just use Google?

- “Value added”: Accuracy, Currency, Specificity
- Control the user experience — look and feel
- Beyond Google, beyond maps: data delivery to The Cloud

Map service architecture

- Internet feeds for the GIS desktop
- Packaged data for web developers



Wish list for the new architecture

Simplify authoring

- Use existing GIS data & composition tools (ArcMap)

Variety of delivery protocols

- ArcGIS Services, WMS, KML
- Consumer chooses best match

“Main Stream” technology

- Support, User community, Maintenance

Good performance

- Tile generation and Caching where appropriate

Make it “Googly”



✓ Simplified authoring

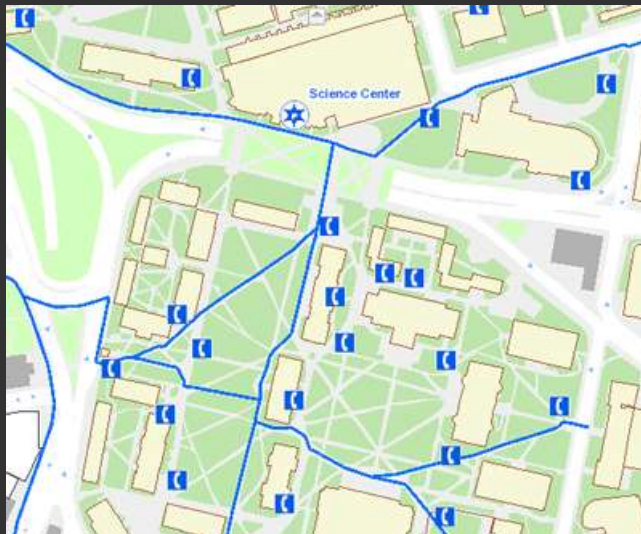
Maps generated directly from ArcMap

- Map service creation/updating is quick

No need for manually coding symbology or rendering (see ArcIMS)

- Programmatic control of rendering is optional

This:



Not this:

```
99 <LAYER type="featureclass" name="Accessible Paths" visible="true" id="PATHS">
00 <DATASET name="Access_paths" type="line" workspace="shp_ws-0" />
01 <GROUPRENDERER>
02 <SCALEDEPENDENTRENDERER upper="1:10799" lower="1:7200">
03 <VALUEMAPRENDERER lookupfield="Layer">
04 <EXACT value="APATH" label="APATH">
05 <SIMPLELINESYMBOL width="2" captype="round" color="0,0,255" antialiasing="true"/>
06 </EXACT>
07 </VALUEMAPRENDERER>
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13 </EXACT>
14 </VALUEMAPRENDERER>
15 </SCALEDEPENDENTRENDERER>
16 </GROUPRENDERER>
17 </LAYER>
18
19 <LAYER type="featureclass" name="Construction" visible="true" id="CONSTRUCTION">
20 <DATASET name="Construction" type="polygon" workspace="shp_ws-0" />
21 <SCALEDEPENDENTRENDERER upper="1:10801" >
22 <SIMPLEPENSER>
23 <SIMPLEPOLYGONSYMBOL boundarywidth="10" boundarytransparency=".0" boundarycolor="255
24 fillcolor="255,255,255" boundarycaptype="round" antialiasing="true" />
25 </SIMPLEPENSER>
26 </SCALEDEPENDENTRENDERER>
27 </LAYER>
28
29 <LAYER type="featureclass" name="Basemap" visible="true" id="BDM">
```



✓ Full complement of geo services

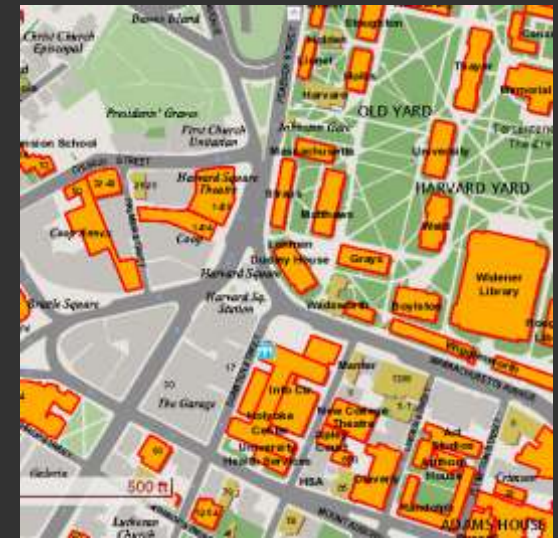
Variety of clients

- Desktop (ArcMap), Web, Mobile

Variety of services

- Maps, imagery, geoprocessing
- Native and Open standards (WMS/WFS)
- KML
- Geocoding, Geoprocessing, Routing
- 3D (ArcGlobe)

Map Service



KML Service



✓ Good developer support

APIs reasonably well documented

Good selection of sample code

Large developer community

Easy to explore map service details

ArcGIS Services Directory

[Home](#)

Folder: /

Current Version: 9.31

View Footprints In: [Google Earth](#)

Services:

- [Accessibility](#) (MapServer)
- [AlternativeEnergy](#) (MapServer)
- [BikeFacilities](#) (MapServer)
- [CambridgeBikeRoutes](#) (MapServer)
- [CambridgeZoning](#) (MapServer)
- [CambridgeZoningOverlays](#) (MapServer)
- [CampusMap](#) (MapServer)
- [EmergencyPhones](#) (MapServer)
- [LEED](#) (MapServer)
- [MapText](#) (MapServer)
- [Museums](#) (MapServer)
- [WirelessLAN](#) (MapServer)

CampusMap (Ma

View In: [ArcMap](#) [ArcGI](#)

View Footprint In: [Goo](#)

Service Description:

Map Name: Harvard Camp

Layers:

- [Text-smallscale](#) (0)
 - [Landmarks](#) (1)
 - [Buildings Under Construction](#) (2)
 - [Hydro Large](#) (3)
 - [Hydro](#) (4)
 - [Yard Gates](#) (5)
 - [Campus Areas](#) (6)

Layer: Buildings (ID: 22)

Display Field: buildings.BL_ID

Type: Feature Layer

Geometry Type: esriGeometryPolygon

Description:

Definition Expression:

Copyright Text:

Min. Scale: 12000

Max. Scale: 0

Extent:

XMin: 741018.694000001
YMin: 2908668.50000003
XMax: 811021.270259518
YMax: 2977385.639999999
Spatial Reference: 2249

Fields:

- buildings.Shape (Type: esriFieldTypeGeometry, Alias: buildings.Shape)
- buildings.BL_ID (Type: esriFieldTypeString, Alias: buildings.BL_ID)
- bld_rpt.Root (Type: esriFieldTypeString, Alias: bld_rpt.Root)
- bld_rpt.Bld_Name (Type: esriFieldTypeString, Alias: bld_rpt.Bld_Name)



Which API?

.NET, Java

- Take advantage of server-side functionality
- Probably most feature rich

Flex, Silverlight

- Great for apps with non-mapping elements (charting, animation)
- Reliant on availability of client-side plug-ins

Google

- Wide adoption, familiar interface
- Simple UI - No need to program controls
- Global street or image base map

Javascript

- Essentially universally supported
- Dojo and other libraries offer many widgets and etc.
- Stateless, asynchronous, client-side processing presents challenges



Application design and functionality goals

Clean interface

- Minimal tool clutter
- Not a GIS

Maximize map area

- Automatically fill the screen

Multiple data layers

- Value added
- Requires interface for selection

Web map API for linking, embedding

Easily configurable



Demo

Current beta release: <http://map.harvard.edu/mapserver/campusmap.htm>

Release candidate: <http://map.harvard.edu/mapserver/campusmapv5.htm>

“Bare map”: <http://map.harvard.edu/mapserver/map.htm>

<http://map.harvard.edu/mapserver/renewable.htm>



Technical design elements

User Interface: Standard HTML, CSS, JS

- Adaptable for alternative apps, embed maps, mobile
- Dojo adds some “syntactical sugar” and widgets

Map “Themes” as discreet services

- Easier maintenance
- Web developers can pick and choose

Configuration file connects the two

- Service parameters: URL, transparency, click tolerance
- Layer parameters
 - Order, visibility, legend info, fields



Current map status

Fine tuning

- Tinkering with page design
- Additional data layers: Libraries, Event venues, Trees, Parking, Dining facilities

Rounding out core functionality

- Printing/Export
- Metadata

Enhancements

- Queries
- Theme ordering
- Autocompletion for Search
- Mobile compatible version



Our experience so far

The Bad

- Specific functionality missing in JS API: Legends, Printing/Image export
- Occasional bugs (zoom slider, layer visible) and documentation omissions
- Appearance of special widgets (zoom, pan, info window) difficult to customize
- Combining multiple services presents challenges

The Good

- Fidelity of map service to MXD: WYSIWIG
- Overall good performance
- Dynamic labeling
- Good documentation with examples
- Strong vendor commitment to support and on-going development

The Ugly?

