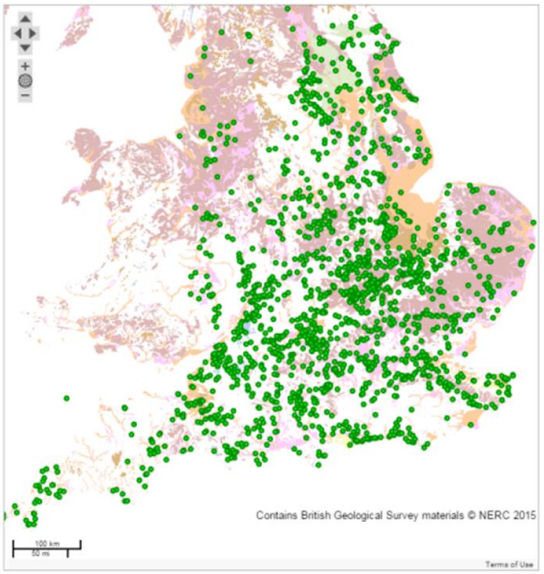


Can we have that on a map?

ARCHAEOLOGY DATA SERVICE

Open Source options for the dissemination of archaeological spatial data

Tim Evans, Archaeology Data Service
Dept. of Archaeology, University of York
01-09-2016

Introduction

- Overview of two decades of archiving + publishing spatial data
- Successes + failures of “Web Mapping”
- Advantages of Open Source approach
- Disclaimer
  - Personal opinion based on 10 years experience
  - A bad workman always blames their tools!

Introduction to the ADS

The Archaeology Data Service:

- set up in 1996
- one of five AHDS subject centres
- based within the University of York

Funding:

- initially received funding from
    - Arts and Humanities Research Board (now AHRC)
    - Joint Information Systems Committee (JISC)
- presently receives core funding from AHRC alongside a range of project-based funding.

ads ARCHAEOLOGY DATA SERVICE

Mission Statement

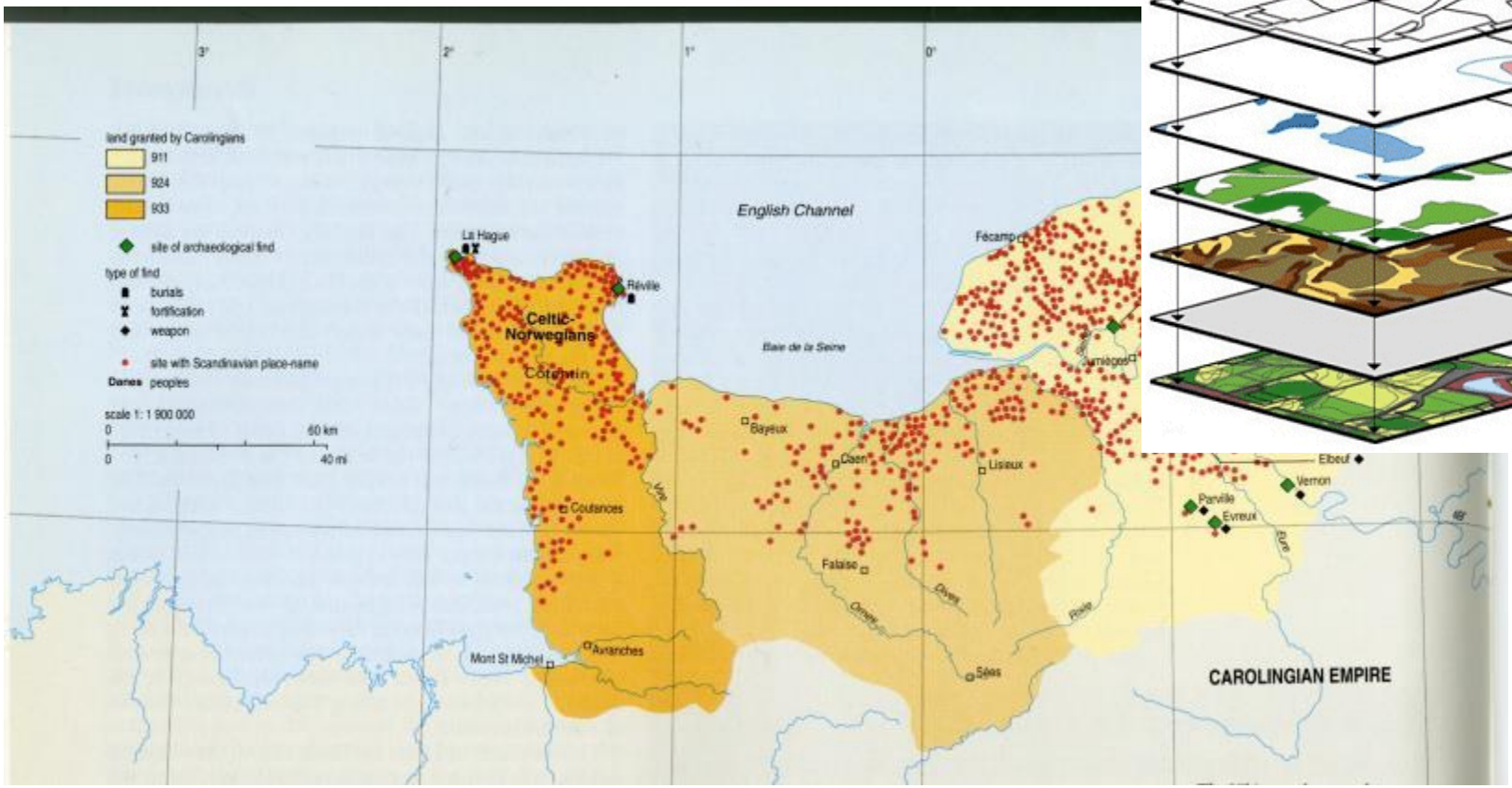
Our remit:

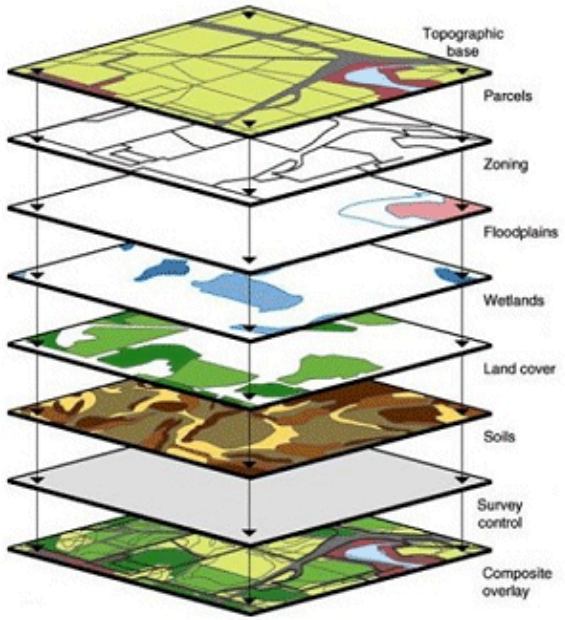
"To support research, learning and teaching with high quality and dependable digital resources."

In practice this means three key things:

- That ADS collect and preserve datasets
- That we allow full, easy and free access to these
- Provide guidance and support to data creators

Archaeological Maps





Archaeological Maps

- ADS hold over 2,000,000 objects
- 12,000 are geospatial
  - ESRI (Shapefile,) , GML, MapInfo
  - Images
  - Geodatabases
  - Raw + processed remote sensing data

- All data archived in perpetuity
  - e.g. Shapefiles migrated to GML (3.2)
- On occasion, map interfaces also replicated as Web Mapping

http://archaeologydataservice.ac.uk

Issues with data

BRIONY BRATTON CLOVELLY

111 AND 113 CHARLESTOWN ROAD CHARLESTOWN

111113 CHARLESTOWN ROAD

49 LOOSELEIGH LANE DERRIFORD

A30 BODMIN BYPASSINDIAN QUEENS IMPROVEMENT

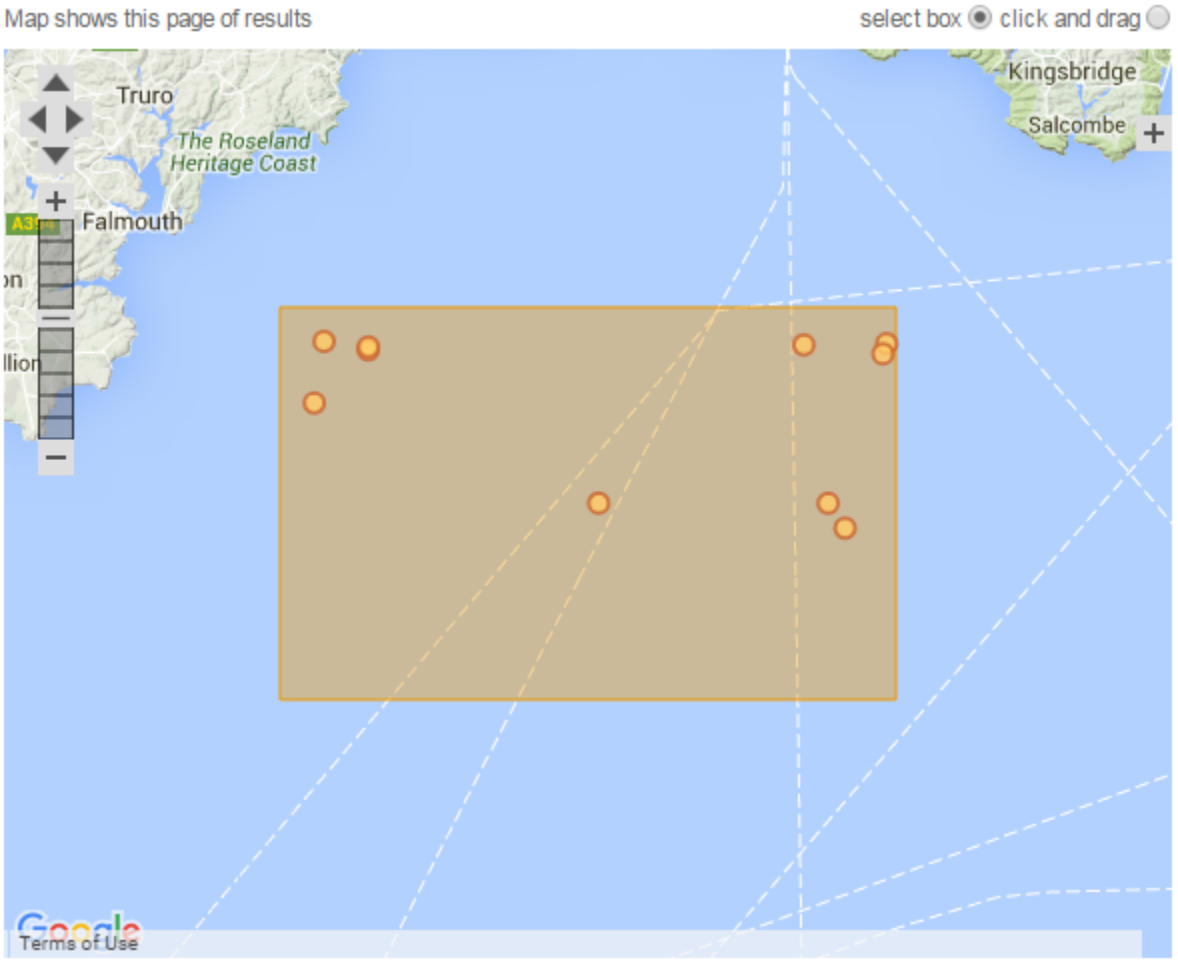
A30 EBSWORTHY

A30 OKEHAMPTON BYPASS

A30 PLUSHA GSJ

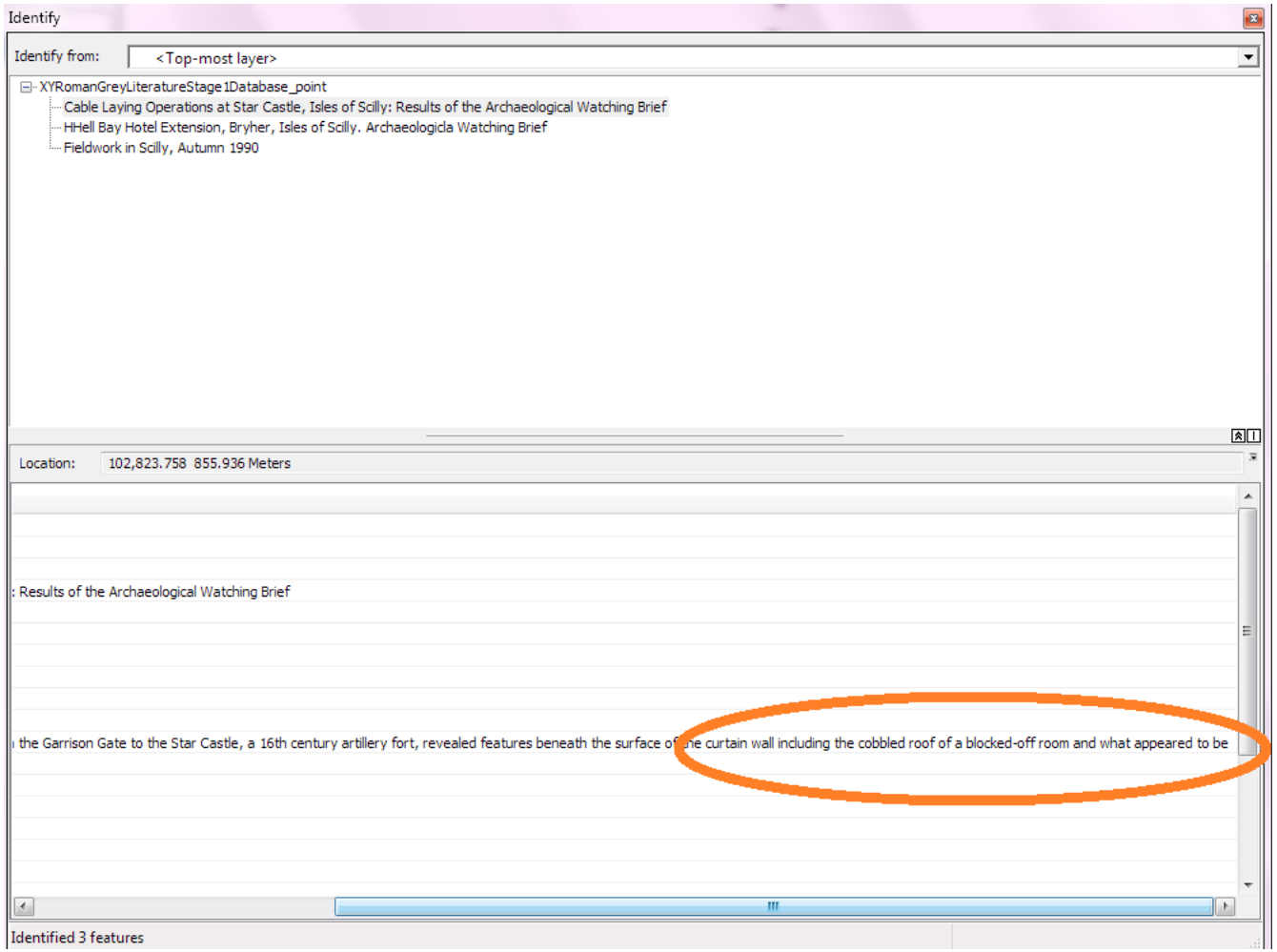
A30 ROAD WIDENING SCHEME

A30 SOURTON DOWN



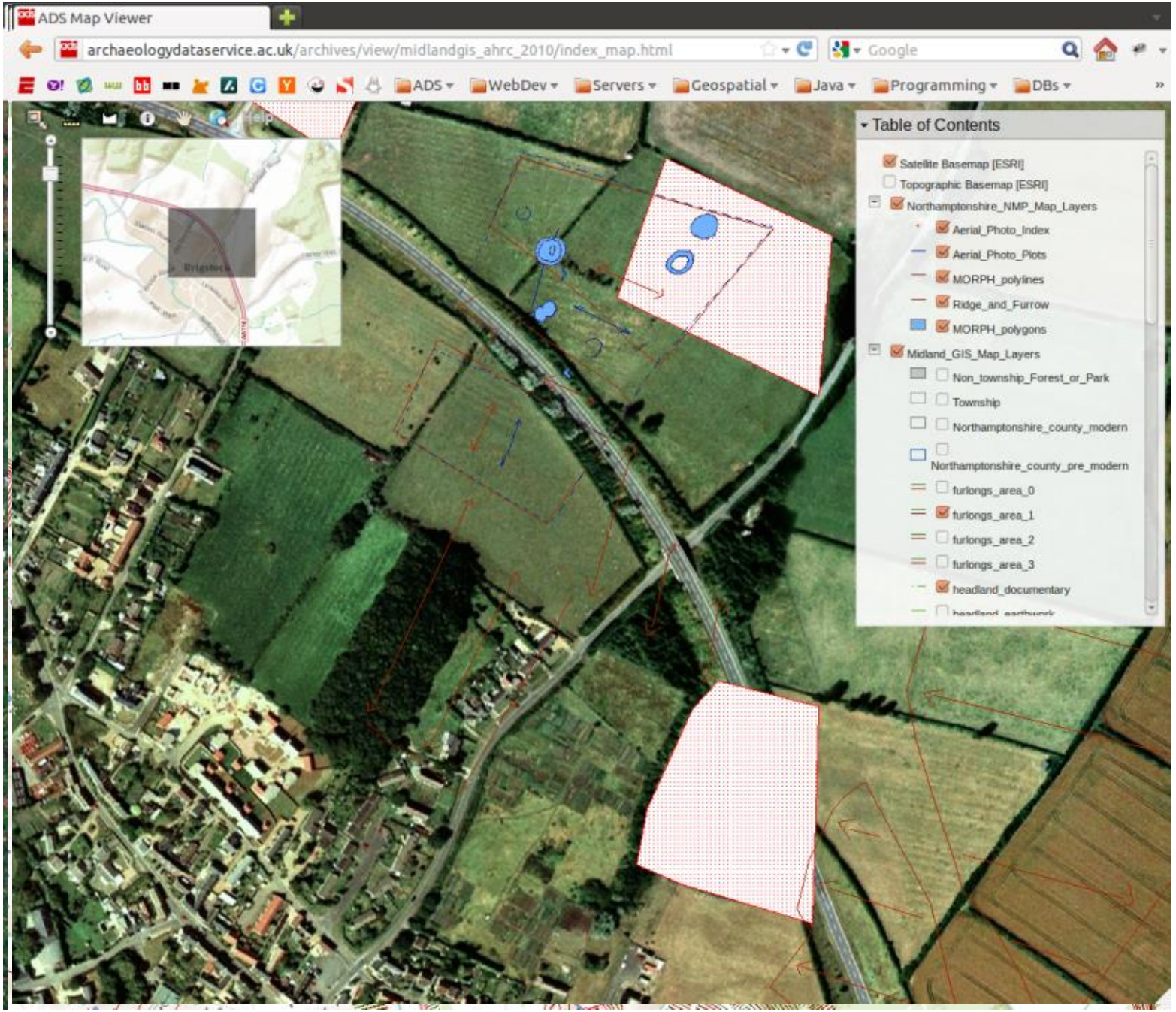
http://archaeologydataservice.ac.uk

Issues with data



Issues with data

- Problems with metadata:
  - Lack of projection, or even wrong projection
  - Lack of source – where has this data come from, should we even have it (third party Copyright)
  - No documentation for attribute fields, a real problem with archaeologists e.g. what does “field1” stand for/actually do. What do the numbers within it mean?


ADS Map Viewer
archaeologydataservice.ac.uk/archives/view/midlandgis_ahrc_2010/index_map.html
Google
ADS
WebDev
Servers
Geospatial
Java
Programming
DBs
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Satellite Basemap [ESRI]
Topographic Basemap [ESRI]
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Aerial_Photo_Index
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MORPH_polylines
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MORPH_polygons
Midland_GIS_Map_Layers
Non_township_Forest_or_Park
Township
Northamptonshire_county_modern
Northamptonshire_county_pre_modern
furlongs_area_0
furlongs_area_1
furlongs_area_2
furlongs_area_3
headland_documentary

ARCHAEOLOGY DATA SERVICE

Long-termIssues Facing the ADS

- Usability
- User Expectation
- Proprietary technology (inc. licensing)
- Sustainability

Traditional approach

- ESRI products used:
  - ArcIMS
  - ArcGIS Server

ArcIMS

- ESRI products used:
  - ArcIMS
    - Publishing an MXD as an AXL file – additional coding required
    - 32-bit application
    - Management is/was still rigid and does not lend itself well to a distributed system. Any sort of map load / reloads will bring **all** your services down momentarily

ArcIMS

Products

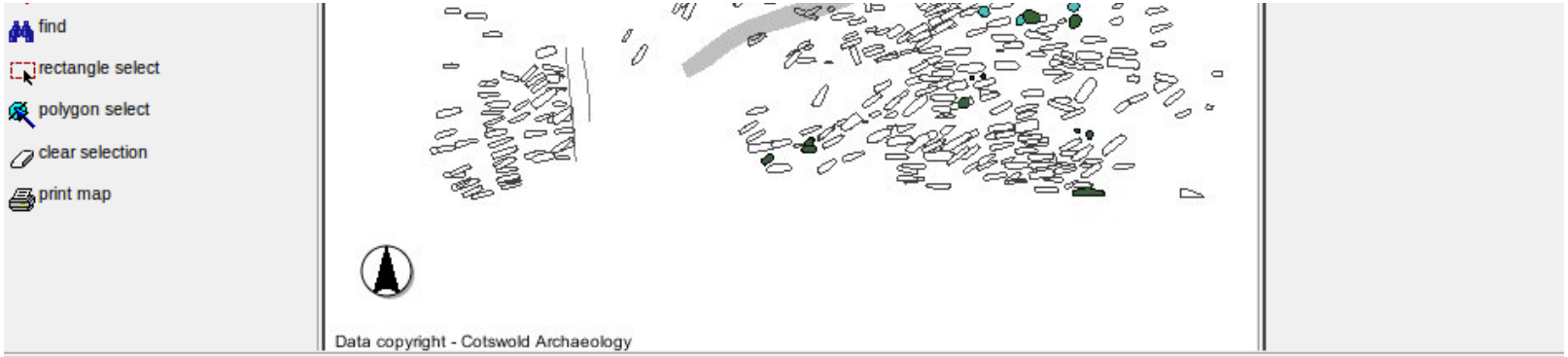
ArcIMS

ArcIMS

ArcIMS will no longer be supported with the release of ArcGIS 10.1.

ArcGIS for Server is Esri's primary server technology. Find out more about ArcGIS for Server.

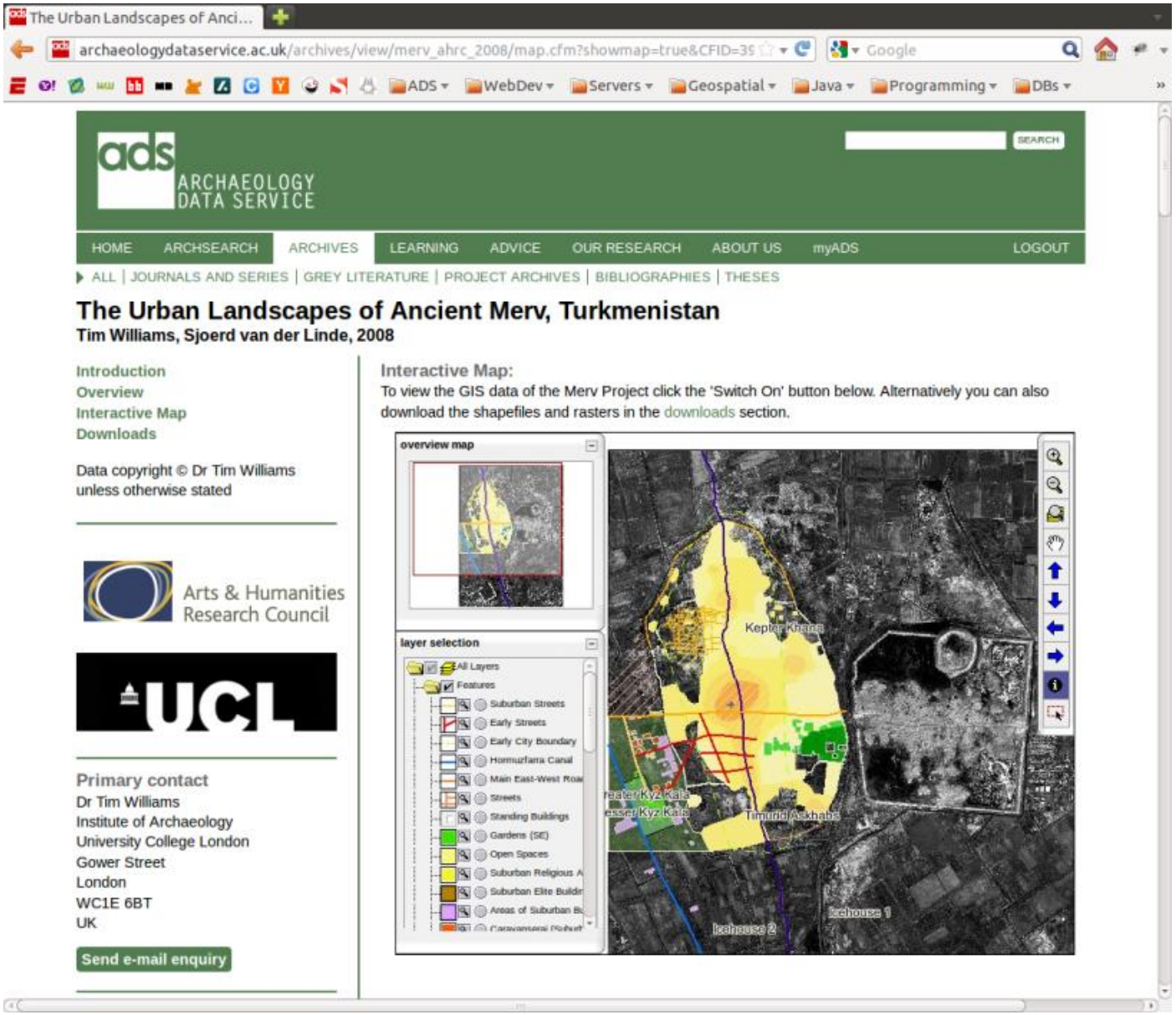
Distribute GIS services over the Web with ArcGIS for Server.



- ArcGIS Server (9.3)
  - Using ArcSDE Geodatabase (9.3)
  - ArcSDE would not restart
  - University upgraded to ArcGIS 10, did not include ArcSDE… problems between Server 10 and older flavour of SDE
  - Trying to migrate data out of SDE was problematic

"The overhead of SDE will suck the life out of you"

ArcGIS Server



Lessons

- ESRI products are dependent on ESRI providing licenses, which they *can* discontinue after a certain amount of time.
- Serious problems with ArcSDE – continual migration of data
- Systems overhead: maintenance of bespoke servers to keep legacy projects

Lessons

<

Geoserver

- Open Source server for sharing geospatial data
- Built on Open Standards
- Community driven

Geoserver

- Simple management of data
  - Access via file store or Geodatabase
  - ‘Publish’ as WCS/WMS/WFS and many more
- Simple customization of data
  - Via custom styles (SDL)
  - Allows querying of features and/or underlying data via SQL/CQL

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OpenLayers 2

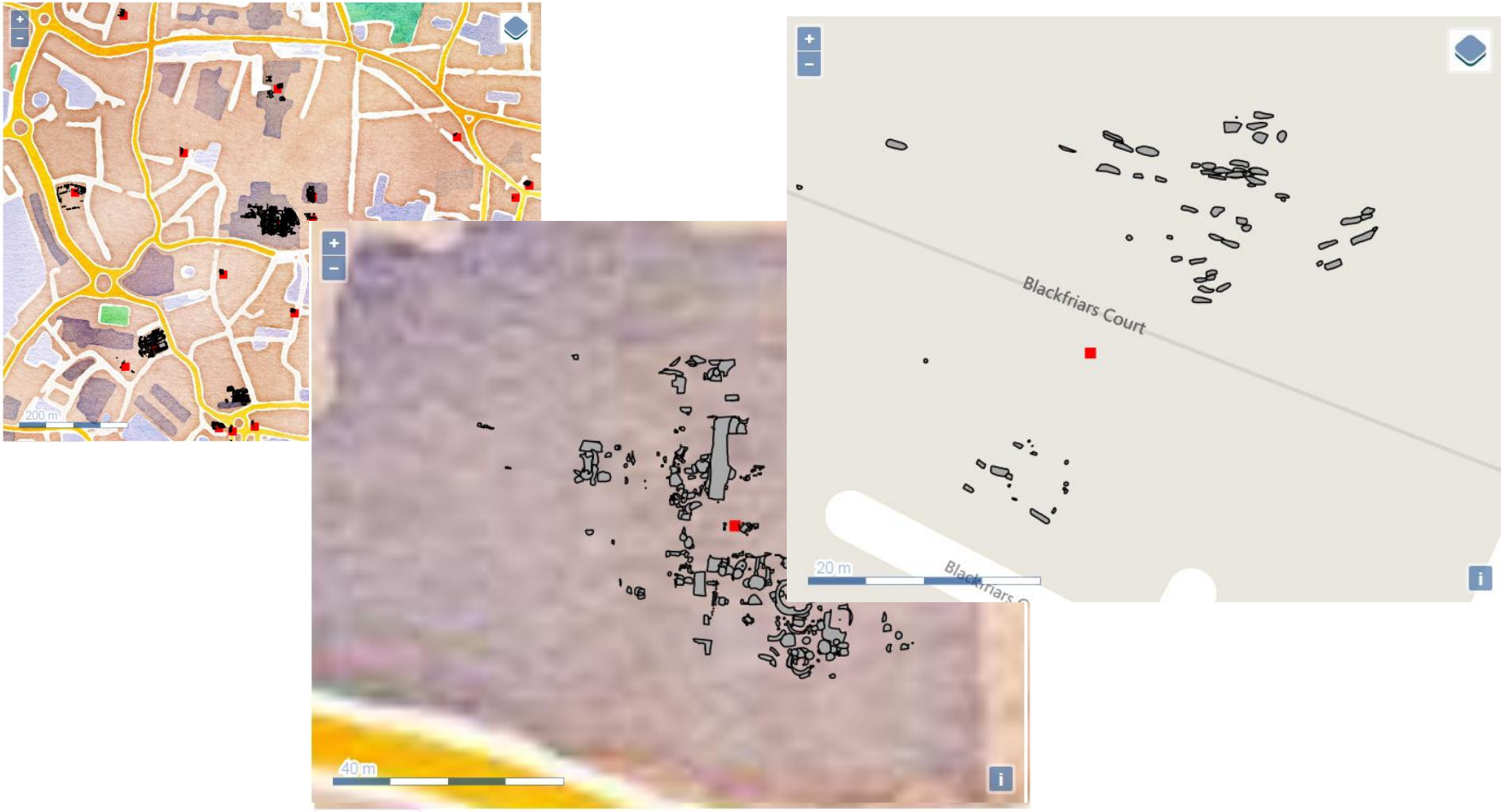
```
var map, select;
var [illegible] = new OpenLayers.Projection("EPSG:27700");
var fromProjection = new OpenLayers.Projection("EPSG:4326"); // transform from WGS 1984
var toProjection = new OpenLayers.Projection("EPSG:3857"); // to Spherical Mercator Projection
function init()

{

var options = {
    projection: new OpenLayers.Projection("EPSG:3857"),
    displayProjection: new OpenLayers.Projection("EPSG:4326"),
    //maxExtent: new OpenLayers.Bounds(-707373.2253437174,6431310.1844211165,191951.78766995683,7517107.730915012),
    restrictedExtent: new OpenLayers.Bounds(-767400,6200000,200000,7517200),
    controls: [
        new OpenLayers.Control.Navigation(),
        new OpenLayers.Control.ZoomBox (),
        new OpenLayers.Control.PanZoom(),
        new OpenLayers.Control.ScaleLine(),
        new OpenLayers.Control.Attribution(),
        new OpenLayers.Control.ArgParser()
        ]
            });

map = new OpenLayers.Map( "map" , options);

//pelagios base map
var imperium = new OpenLayers.Layer.XYZ("Imperium Romanum",
[
  "http://pelagios.dme.ait.ac.at/tilesets/imperium/${z}/${x}/${y}.png"
], {
    sphericalMercator: true,
    transitionEffect: "resize",
    buffer: 1,
    isBaseLayer: true,
    numZoomLevels: 12,
    attribution: "Digital map of the Roman Empire courtesy of <a href='http://dare.ht.lu.se'>Digital Atlas of the Roman Empire (DARE) project</a> under a CC-BY-SA
      license"
    }
    );

//oas map
var osm = new OpenLayers.Layer.OSM();
```

ARCHAEOLOGY DATA SERVICE

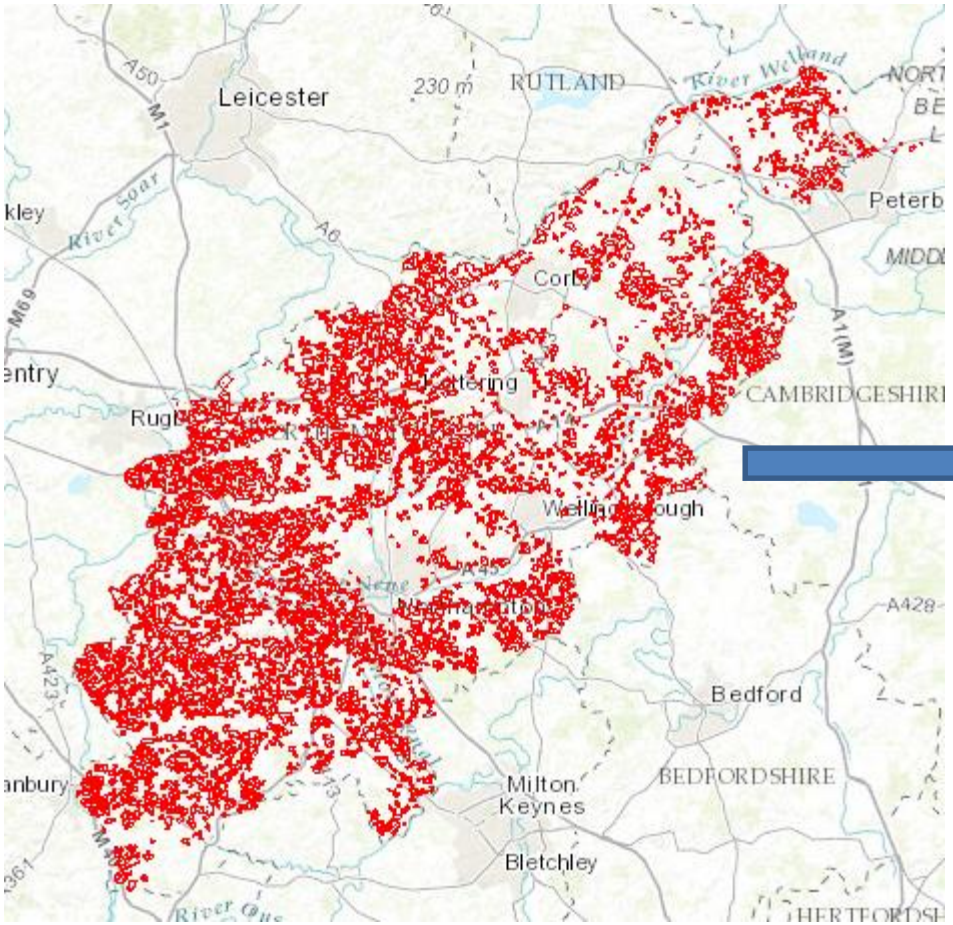
OpenLayers 2

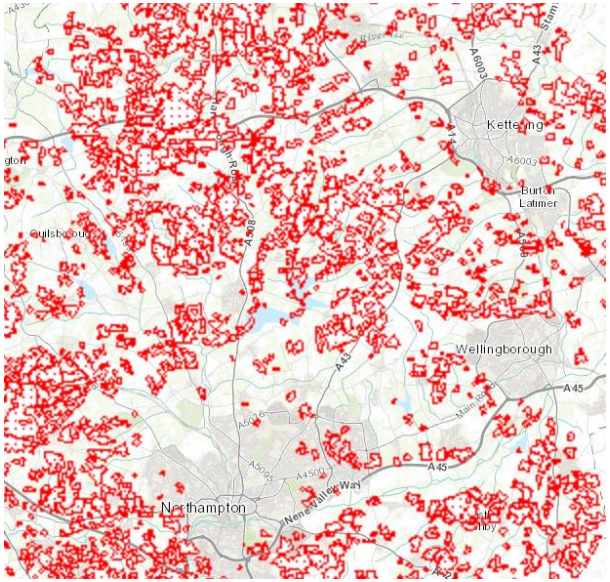
```
function updateFilter(){
    if(pureCoverage)
      return;

    var filter_start = document.getElementById('filter_start').value;

    // by default, reset all filters
    var filterParams = {
        filter_start: null,
        cql_filter: null,
        featureId: null
    };
    if (OpenLayers.String.trim(filter_start) != "") {
            filterParams["cql_filter"] = "DATE_START <='"+filter_start+"' AND DATE_END >='"+filter_start+"'";
    }
    // merge the new filter definitions
    mergeNewParams(filterParams);
}

function resetFilter() {
    if(pureCoverage)
      return;

    document.getElementById('filter_start').value = "";
    updateFilter();
}
```

Functionality

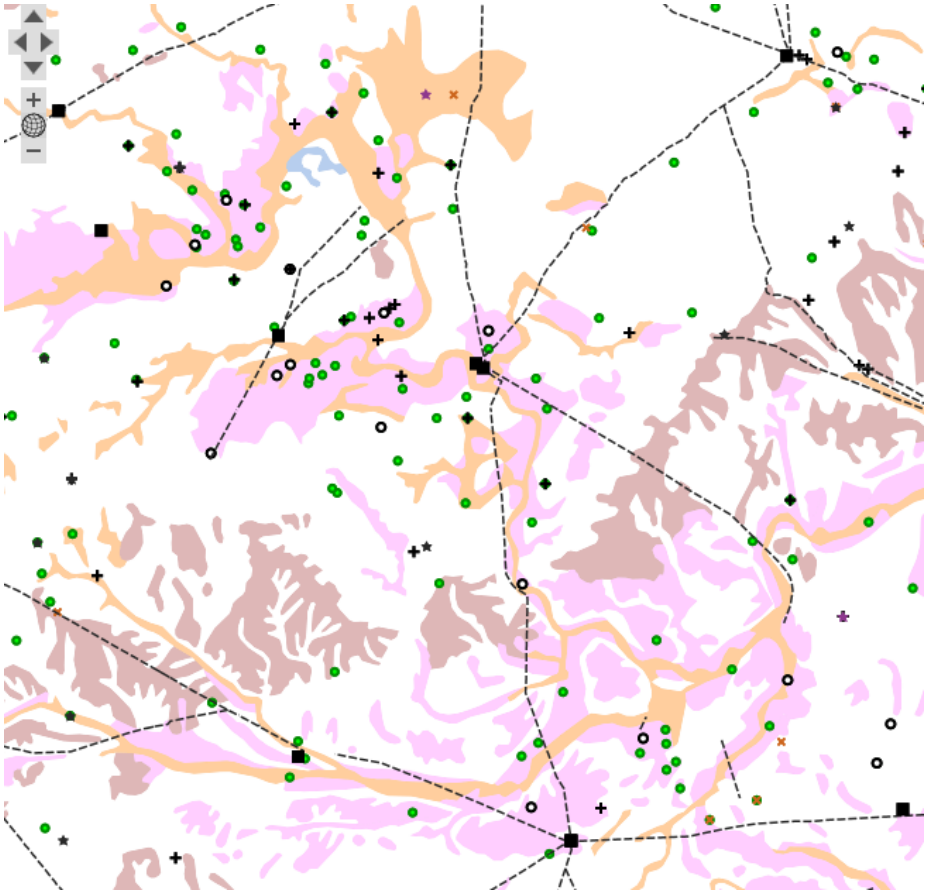


ArcGIS Server vs GeoServer





ArcGIS Server vs GeoServer



Base Layer

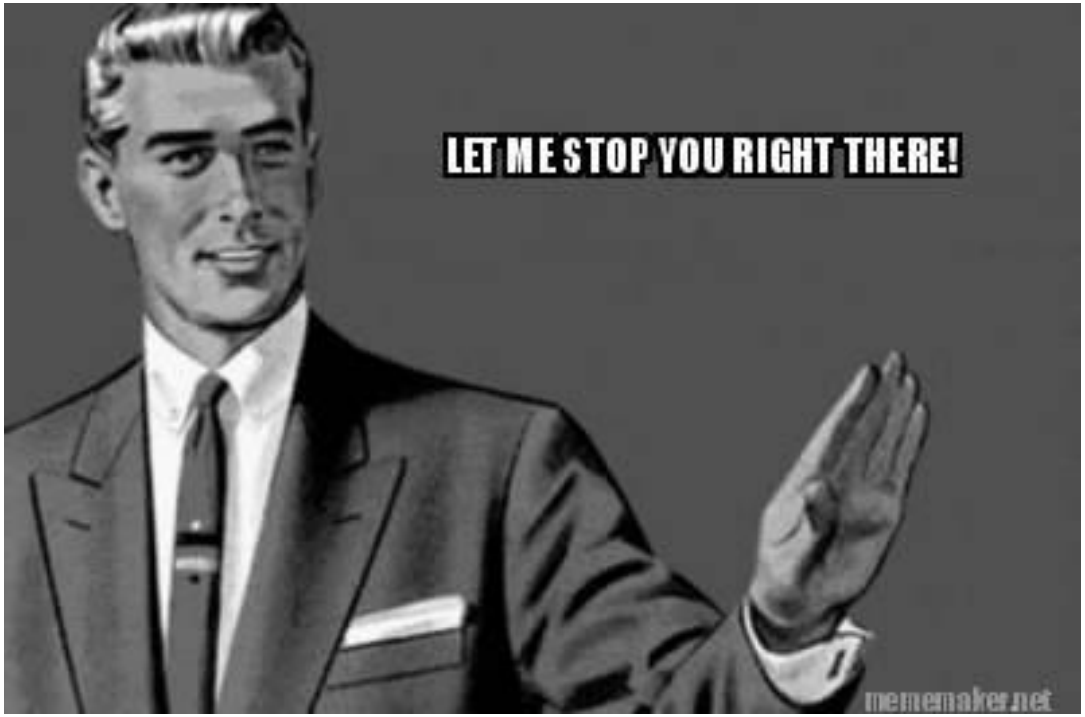
- *Imperium Romanum*
- *BGS 1:625k Bedrock Lithology*
- *BGS 1:625k Superficial Lithology*
- *OS Terrain: 50m grid resolution*
- *OpenStreetMap*
- *Google Satellite*

Overlays

- [ ] All sites
- [x] Farms
- [x] Farms: complex
- [ ] Farms: enclosed
- [ ] Farms: unenclosed
- [ ] Field system
- [x] Funerary site
- [x] Iron production site
- [ ] Other industry site
- [ ] Pottery production site
- [x] Romano-Celtic temple
- [ ] Roadside settlement
- [ ] Salt production site
- [x] Shrine
- [ ] Tile production site
- [ ] Vicus
- [ ] Villa
- [ ] Village
- [x] Roman Roads
- [x] Roman Towns
- [ ] Large settlements

http://archaeologydataservice.ac.uk

However…



Possible issues

- Longevity
  - OpenLayers 3
    - radical overhaul of code base
    - makes heavy use of the new capabilities of modern Web browsers (Canvas, WebGL)
    - e.g. integration of 3D data
- Means learning a whole new library of code!
  - Re-writing rather than migration
- Still a skills investment required

Choices

- Dozens of options for Web Mapping
  - MapServer, Geoserver, GeoCommons (purchased by ESRI in 2012!), Google Maps etc
- Although offers a mapping experience with low resource demands

Looking forward

- Open Source solutions a lot more future proof
- Depends on browser support rather than institutional upgrading
- Is “web mapping” ever going to be sustainable?

Paradox

The page cannot be found

The page you are looking for might have been removed, had its name changed, or is temporarily unavailable.

Please try the following:

- Make sure that the Web site address displayed in the address bar of your browser is spelled and formatted correctly.
- If you reached this page by clicking a link, contact the Web site administrator to alert them that the link is incorrectly formatted.
- Click the Back button to try another link.

HTTP Error 404 - File or directory not found.
Internet Information Services (IIS)

Technical Information (for support personnel)

- Go to Microsoft Product Support Services and perform a title search for the words **HTTP** and **404**.
- Open **IIS Help**, which is accessible in IIS Manager (inetmgr), and search for topics titled **Web Site Setup**, **Common Administrative Tasks**, and **About Custom Error Messages**.

y comes

ite lifespan

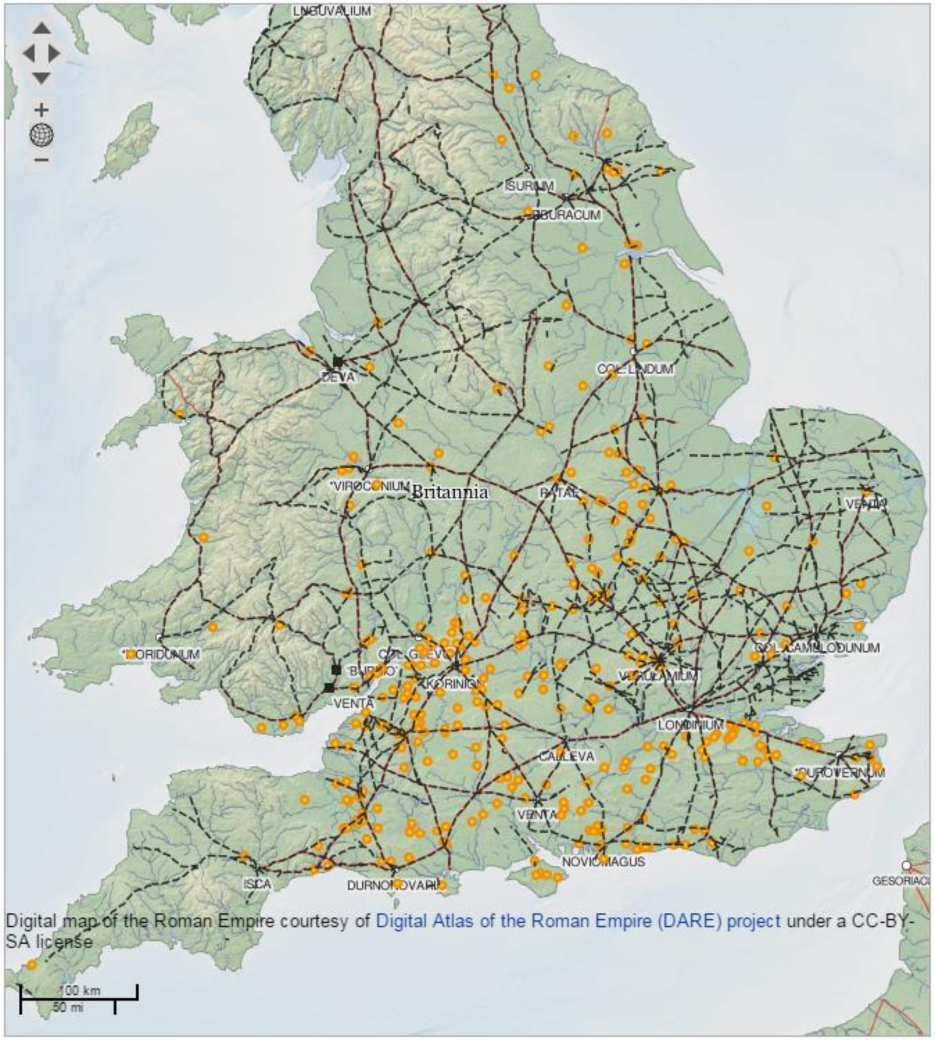
Final thoughts

About this map:

This map displays layers from the project database, which can be viewed against a range of baseline datasets. The layers also include Roman roads and settlements derived from Historic England NRHE dataset held by the ADS. In addition, the data from Stage 1 of the Assessing The Research Potential of Grey Literature in the study of Roman England project 10.5284/1000418 is also included.

Tips:

- Click on the 🌐 icon to return to the original extent
- Click on a point to view name and to link to the full record
- To zoom in on a specific area: hold down the left-mouse button and the SHIFT key, and draw a rectangle using your mouse



Digital map of the Roman Empire courtesy of Digital Atlas of the Roman Empire (DARE) project under a CC-BY-SA license

Click on the Key icon to see information and symbols for base mapping layers used in this project

Base Layer

- ◉ *Imperium Romanum*
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- ○ *BGS 1:625k Superficial Lithology*
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- ☐ Roadside settlement
- ☐ Salt production site
- ☐ Shrine
- ☐ Tile production site
- ☐ Vicus
- ☑ Villa
- ☐ Village
- ☑ Roman Roads
- ☐ Roman Towns
- ☐ Large settlements
- ☐ Assessing the Research Potential of Grey literature in the Study of Roman England: Stage 1 Data

Filter Sites by date

Use the search box to filter sites by a specific date, for example 43 or 410

Year:

Final thoughts

- Importance of an **archive**
  - Access to original data in perpetuity is of fundamental importance
  - Embrace the potentials of web-based dissemination for innovation and impact
- WMS Publishing & Consumption
  - Why aren't we producing more?
- Linked Data & GeoSPARQL
- Lookups for historic placenames/boundaries