

The Benefits of Consolidating Spatial Data Using Oracle Technology

Hull City Council's Experience

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- Options
- Implementation
- Benefits

Background

General Background

- Saving money – reduced duplication, easier access
- Improving customer service
- Evidence-based resource targeting
- Modernisation
- Seamless data sharing
- Data quality

Drivers

- Remove data duplication
 - At least 50 datasets, separately maintained
- Reduce licence costs
 - ~ 60 pro GIS licences = £1.5k each + maint + training
- Make access easy
 - < 6 GIS/spatial data technicians in 14,000 staff
- Improve visibility, decision making, accountability
 - Areas with devolved budgets but not line mngt
- Specifics
 - Priority Service Transformation Outcomes G14, G5

Spatial Data Store (SDS)

Data Sources

CORE
INTERNAL
D'BASES

INTERNAL
MAPPING
DATA

INTERNAL
SYSTEMS
D'BASES

PARTNERS
DATA

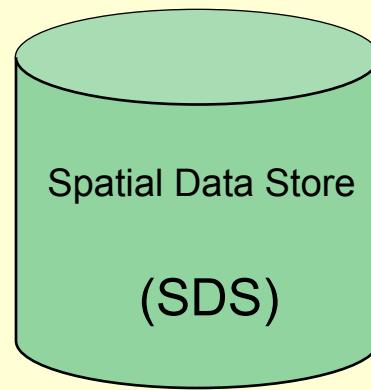
**BASE 'SPATIAL' DATA -
LABELS**

**BASE SPATIAL DATA,
SUPPLEMENTARY
SPATIAL DATA**

**SUPPLEMENTARY
DATA THAT CAN
BE SHOWN
SPATIALLY**

**DATABASE-
SOURCED OR
MAP-SOURCED
FROM EXTERNAL**

Data Storage &
Distribution
Management



**ADDRESS & SERVICE
LOCATOR, REPORT
VISUALISER**

**ADDRESS & SERVICE
SEARCH, REPORTS**

**MULTI-SOURCE DATA,
INC NOT FROM MAPS**

**MULTI-SOURCE
DATA**

**ENRICHED / RE-
PROFILED DATA**

Data Destination

BROWSER
MAPPING

BROWSER TEXT
RESULTS

INTERNAL
GIS USERS

INTERNAL
SYSTEMS

PARTNERS

Spatial Data Store (SDS)

Data Sources

GMS HULL
GMS OOT

**LLPG , NSG
HULL AND EXTERNAL**

CRM

**GRAFFITI INCIDENTS,
MISSED BINS,
FLYTIPPING INCIDENTS**

IN HOUSE
MAPPING
DATA

**POLITICAL AREAS
SCHOOLS,
ENVIRONMENTAL
OPERATIONALMAPS**

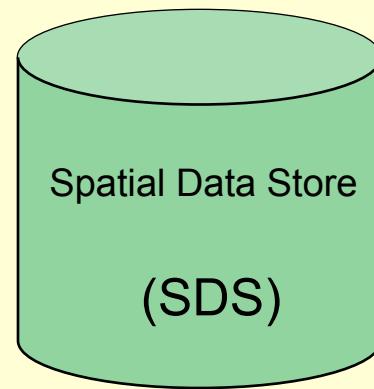
IN HOUSE
SYSTEMS

**EXOR, FLARE,
SLITS, HITS,
I-WORLD, IBS,
COMMIT, EMS**

PARTNERS
DATA

**POLICE,
DTZ**

Data Storage & Distribution Management



**LLPG, NSG, BIN DAY,
CTAX BAND,
CATCHMENT AREA**

Data Destination

CRM
APPOINTMENTS

**ADDRESS & SERVICE
SEARCH, REPORTS (EG
GRAFFITI VS TRUANCY)**

BROWSER TEXT
RESULTS

**ADDRESS & SERVICE
LOCATOR, REPORT
VISUALISER (EG
GRAFFITI VS TRUANCY)**

BROWSER
MAPPING

**WARDS, AREAS,
POLICE HOTSPOTS,
MISSED BINS**

IN HOUSE
GIS USERS

**GRAFFITI
INCIDENTS,
WARDENS**

IN HOUSE
SYSTEMS

**LLPG, NSG,
WARDS, AREAS**

PARTNERS

Options

Network File Storage

Advantages

- Cheap
- Easy to provide

Disadvantages

- Relies on manual enforcement of procedures to operate effectively
- Data sharing is more difficult especially across organisations
- Few of the advantages of a database approach

Central Database With Spatial Middleware

Advantages

- All the advantages of a database approach

Disadvantages

- Expensive as it requires an additional server for the middleware
- All GIS functionality has to go through the middleware
- Spatial data is stored as binary objects so data sharing is difficult and access is restricted to a single GIS

Oracle Spatial Database

Advantages

- All the advantages of a database approach
- Spatial component is inside the database and not middleware
- Oracle Spatial is a mature, reliable and functionality-rich product
- Few data modelling restrictions
- Oracle's open-standards approach makes data sharing easier
- Seamless integration with other Oracle products

Disadvantages

- Expensive (if a license doesn't already exist) – but can use Locator for many functions

What About Data Dissemination?

- Thick-client (desktop) GIS has traditionally been used for the map data
- Desktop GIS is functionality rich but often requires customisation as a result
- Licenses are expensive
- Performance can be poor when accessing network or database data
- You have to install it
- Not easy to serve data to the public using Desktop GIS

- But now it is treated like any other data which makes it easy to disseminate in other ways e.g. via a browser, web services etc

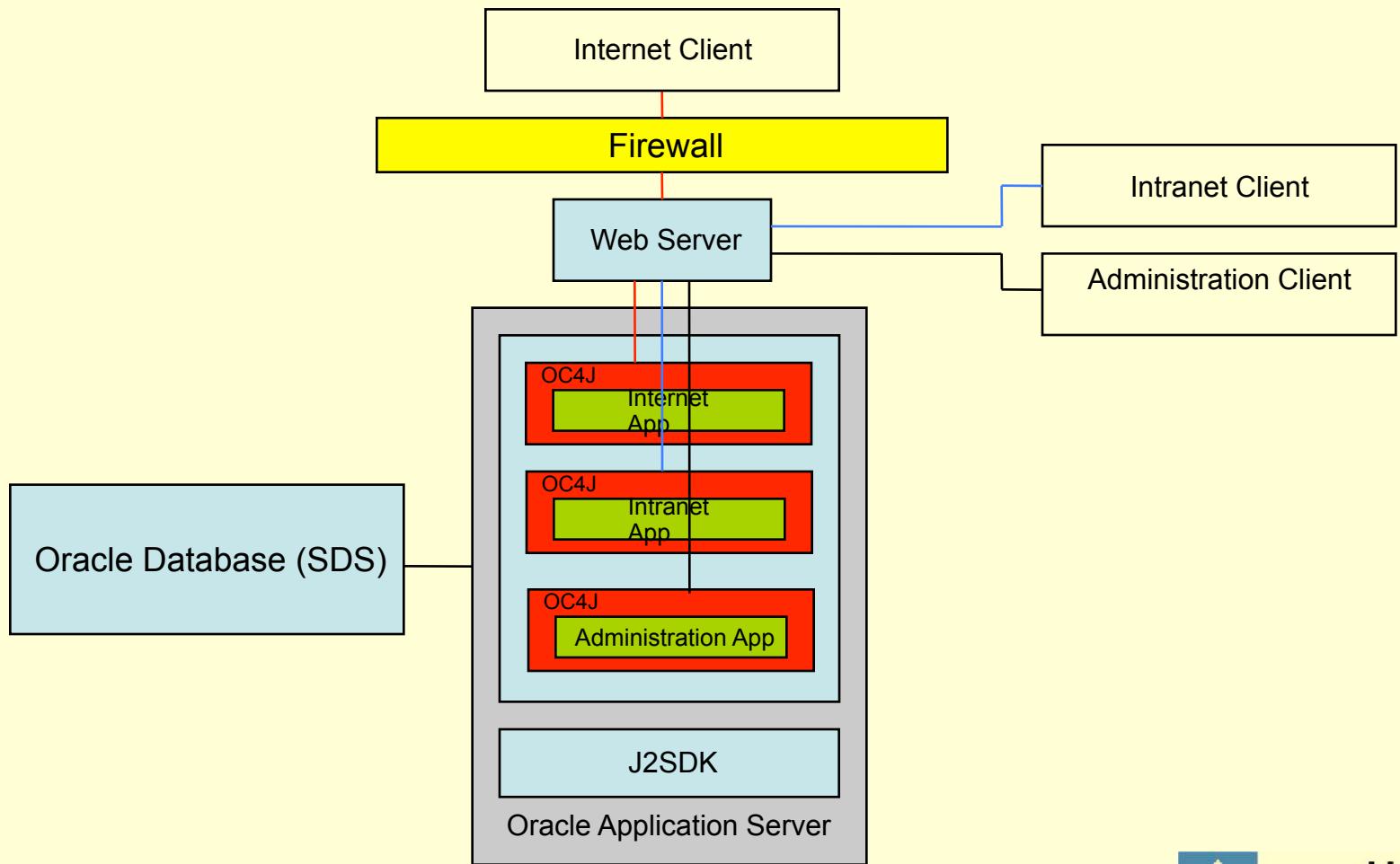
Implementation

The Solution

Spatial Data Store + MyMaps (browser-based mapping)

- The SDS is about effective data management
- Browser-based mapping is about consuming (viewing) the data easily

Chosen Architecture



Data Centralisation – How Was It Done?

- Oracle database was installed
- The data was loaded which included metadata and index creation
- The Address-point data was partitioned
- The data was validated, any errors rectified and re-loaded
- Materialised views were used to create daily snapshots of the LLPG and LSG data
- ISO-19115 compliant metadata was created for the spatial data

Data Delivery – How Was It Done?

- Oracle Application Server was installed
- A custom application was developed using HTML, JSP, AJAX, Java and iSMART for the mapping engine
- Permissions were implemented using JAZN
- Access to spatial layers and functionality controlled by permissions that provided for two flavours of the application, one for the Internet and for the Intranet
- Internet flavour enabled the public to locate to their address and view road works (and other useful) information
- Intranet flavour provided staff with improved access to more, better quality information and the means to query it online thus improving decision-making

The Internet Version

KuHCC Intranet - Mozilla

File Edit View Go Bookmarks Tools Window Help

Back Forward Reload Stop <http://localhost:8888/ismart/HullIntranet/sw/mapPage.jsp?rand=0.3578802499348683> Search Print

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Hull City Council

accessing your council

Quick Links: [Report | Apply | Pay | Book]

Search this site

Legend Address Search Notices Help

Attribute Details Property

Enter a full or partial address.

Building Name/No:

Street:

Postcode:

Use + or street name to expand results
Select the property to show its location on the map

Properties found (76)

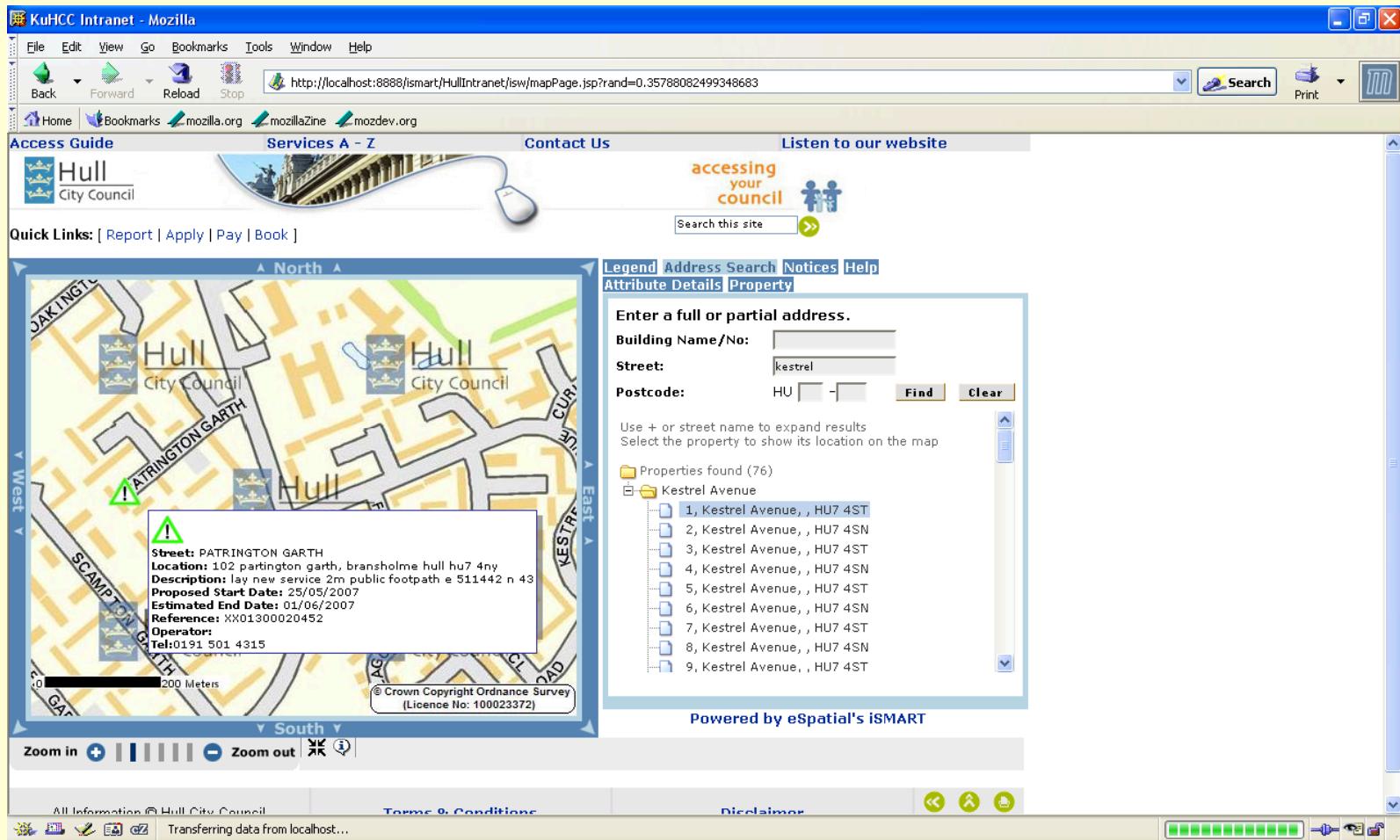
1. Kestrel Avenue, , HU7 4ST
2. Kestrel Avenue, , HU7 4SN
3. Kestrel Avenue, , HU7 4ST
4. Kestrel Avenue, , HU7 4SN
5. Kestrel Avenue, , HU7 4ST
6. Kestrel Avenue, , HU7 4SN
7. Kestrel Avenue, , HU7 4ST
8. Kestrel Avenue, , HU7 4SN
9. Kestrel Avenue, , HU7 4ST

Powered by eSpatial's iSMART

Zoom in + Zoom out -

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Transferring data from localhost...



The Intranet Version

KuHCC Intranet - Mozilla

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Back Forward Reload Stop http://localhost:8888/ismart/HullIntranet/sw/mapPage.jsp?rand=0.42397553165408963 Search Print

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Choose a section Go Print

Legend Address Search Notices Help Query Attribute Details Property Metadata

Select where column GEOM

Select condition WITHIN DISTANCE

Enter distance 1500 METRE

Enter comparison

Select logical condition None

Show SQL Run SQL Back Next

SQL

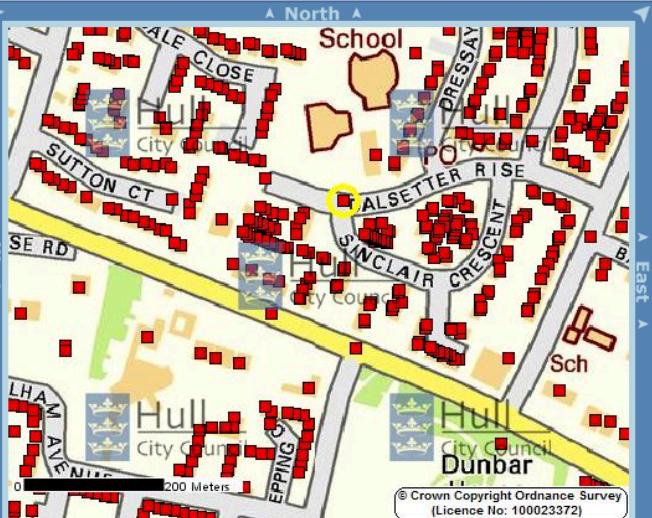
```
SELECT ID,SECONDARY_SDOGID FROM PUBLIC_THEME_SECONDARY_LOCATION WHERE SDO_WITHIN_DISTANCE(GEOM,?, 'DISTANCE=1500 UNIT=METER') = 'TRUE'
```

Error Step 2 of 3

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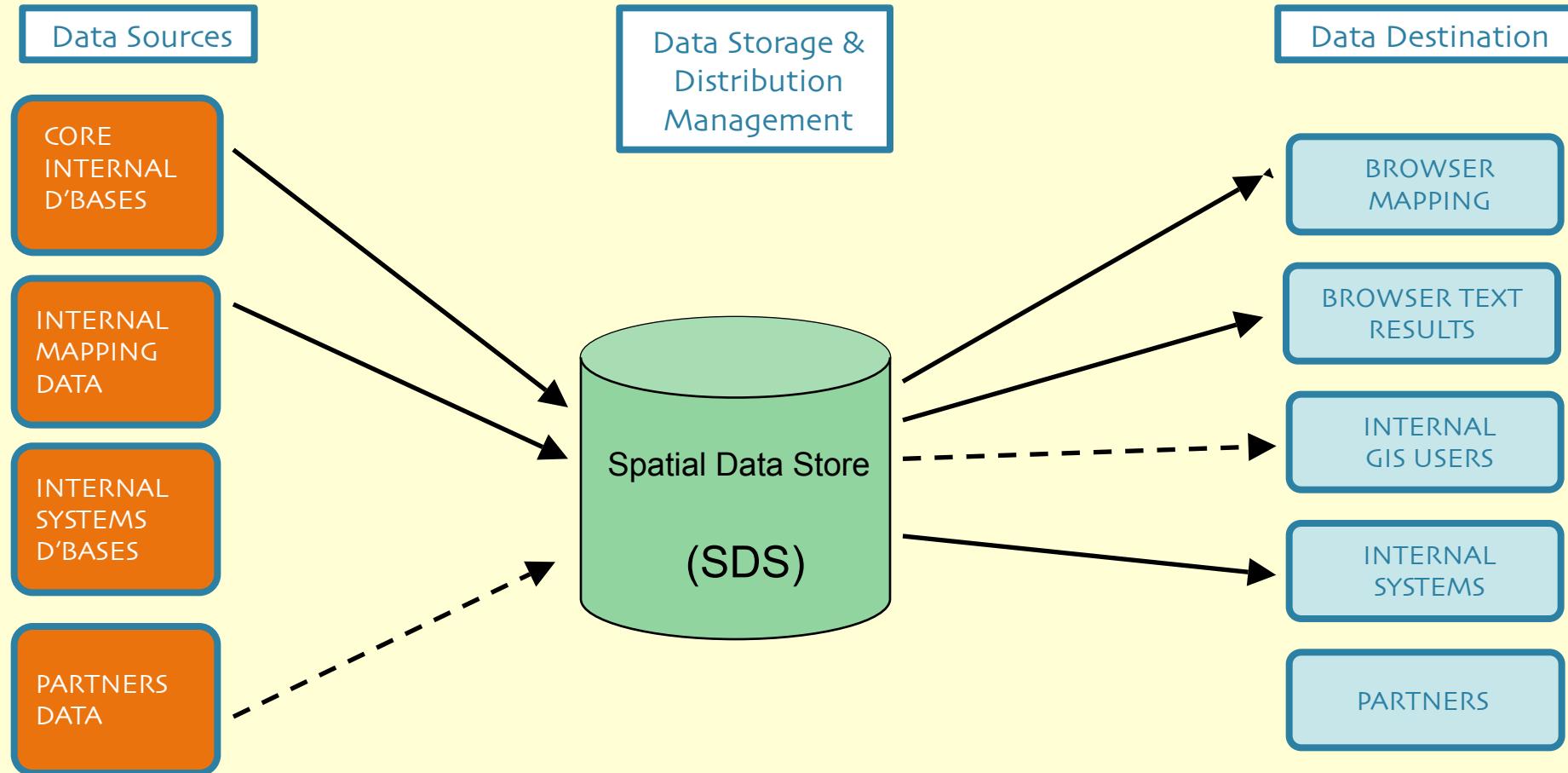
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Done

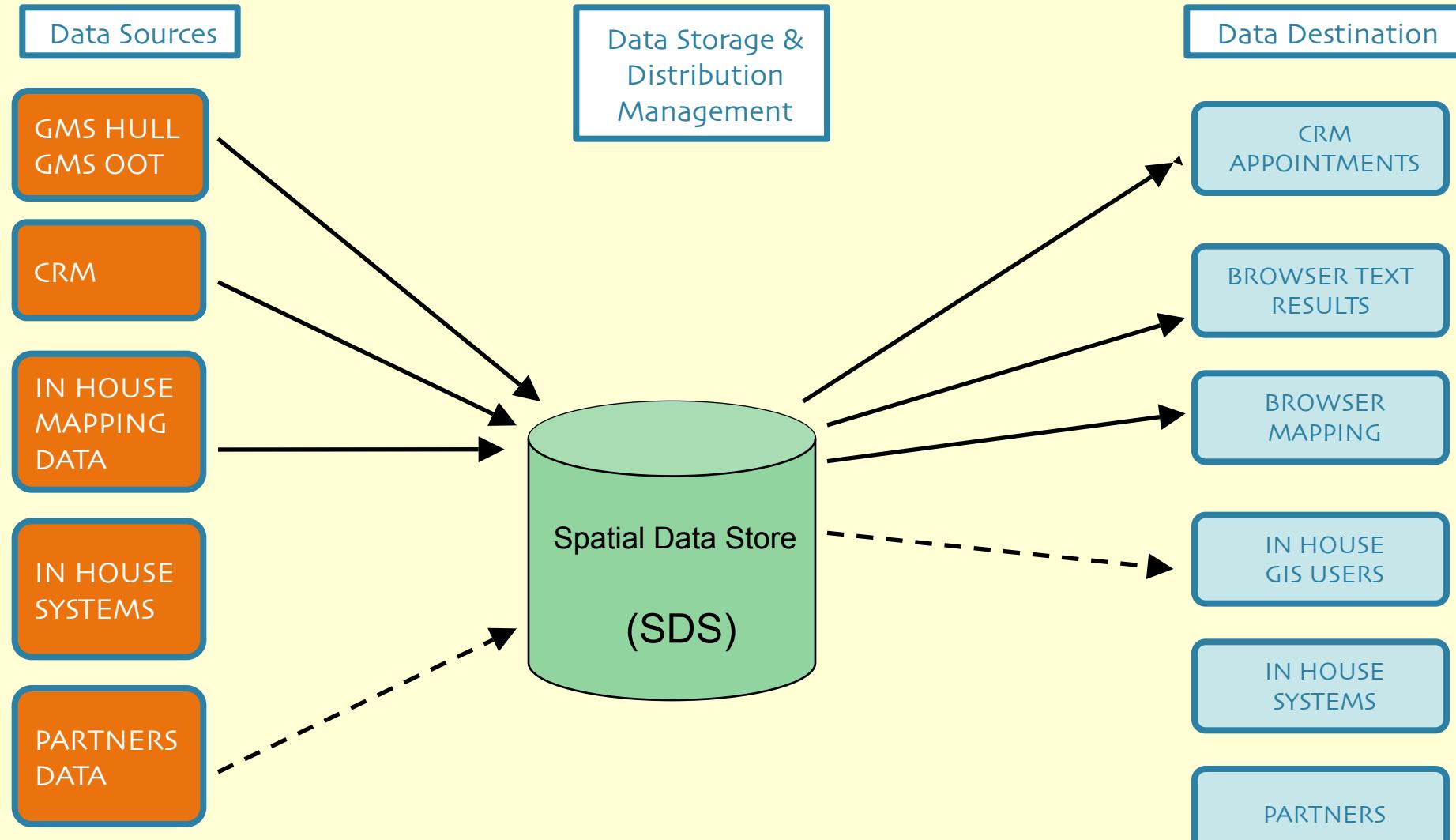


Where we have got to

Spatial Data Store (SDS)



Spatial Data Store (SDS)



Benefits

The Solution

SDS (Spatial Data Store) – Oracle Spatial

The SDS is about effectively managing the spatial data we have

- reduce duplication
- minimise manual updating
- standardise formats to make it possible to share
- utilise open formats
- de-specialise for use by non-GIS experts
- pool in one place for ease of access, inc. partners

The Solution

MyMaps Internet&Intranet (browser-based mapping) eSpatial's iSmart product

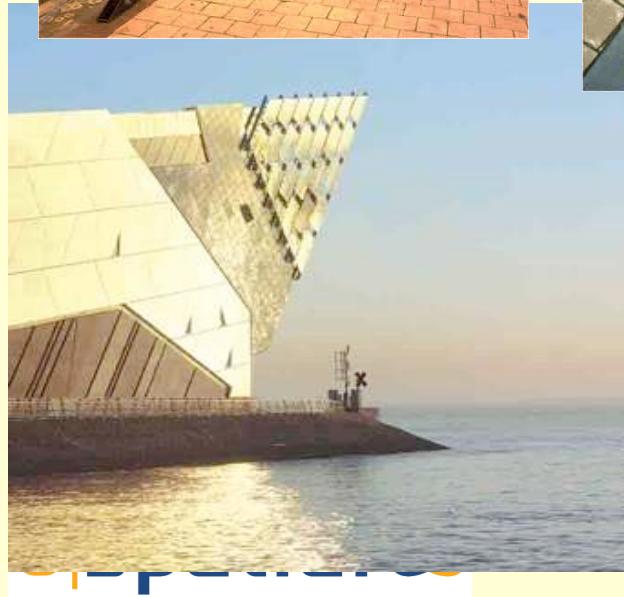
browser-based mapping is about consuming (viewing) the data easily

- reduce licence costs and need for GIS specialists
- simple look-ups
- proliferate (area) management information
- show pooled in one place for ease of access

General Benefits

- Saving money
- Evidence-based resource targeting
- Seamless data sharing
- Data quality
- Potential for advanced functionality
- Responsiveness

Kingston upon Hull



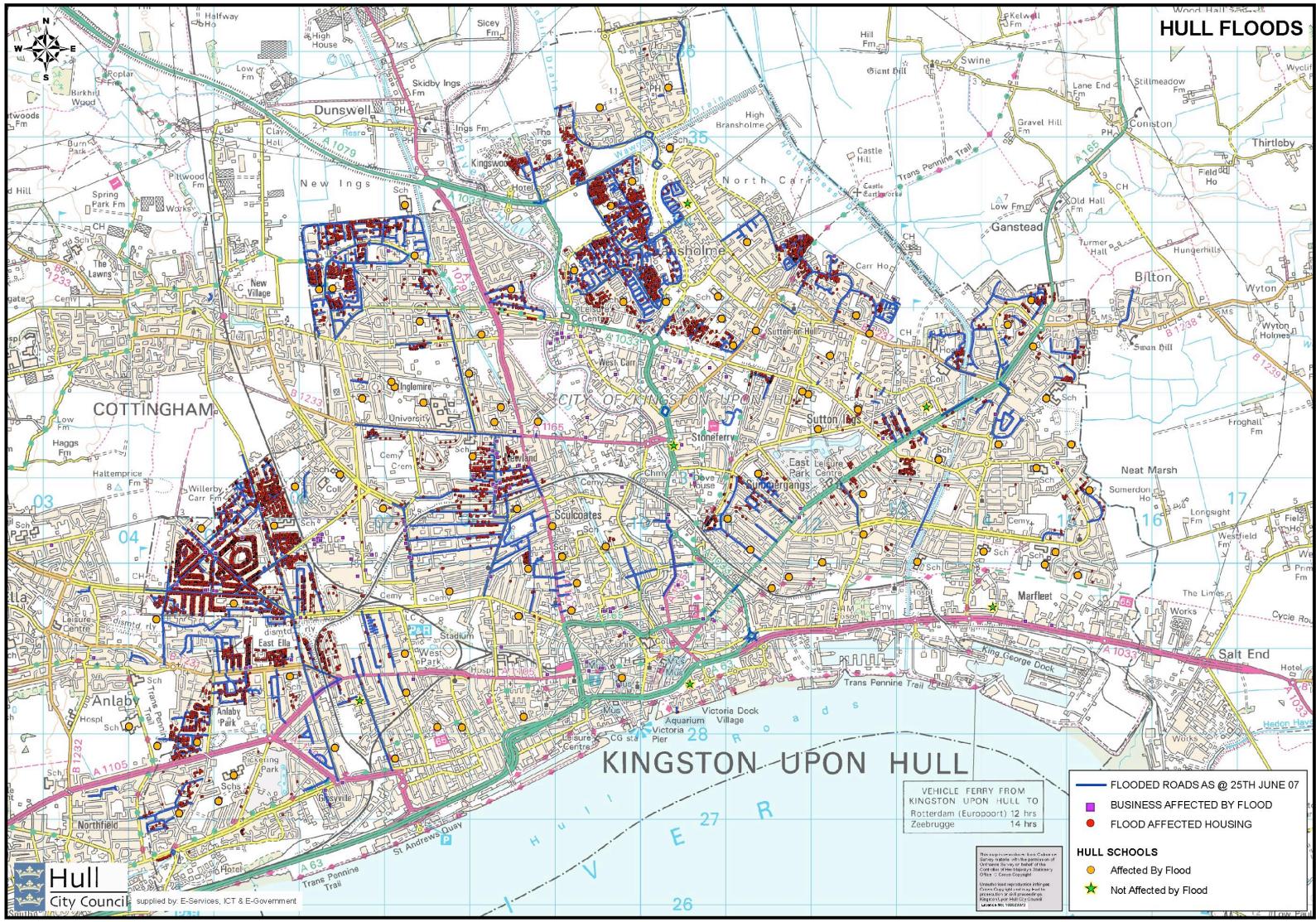
Flood Response

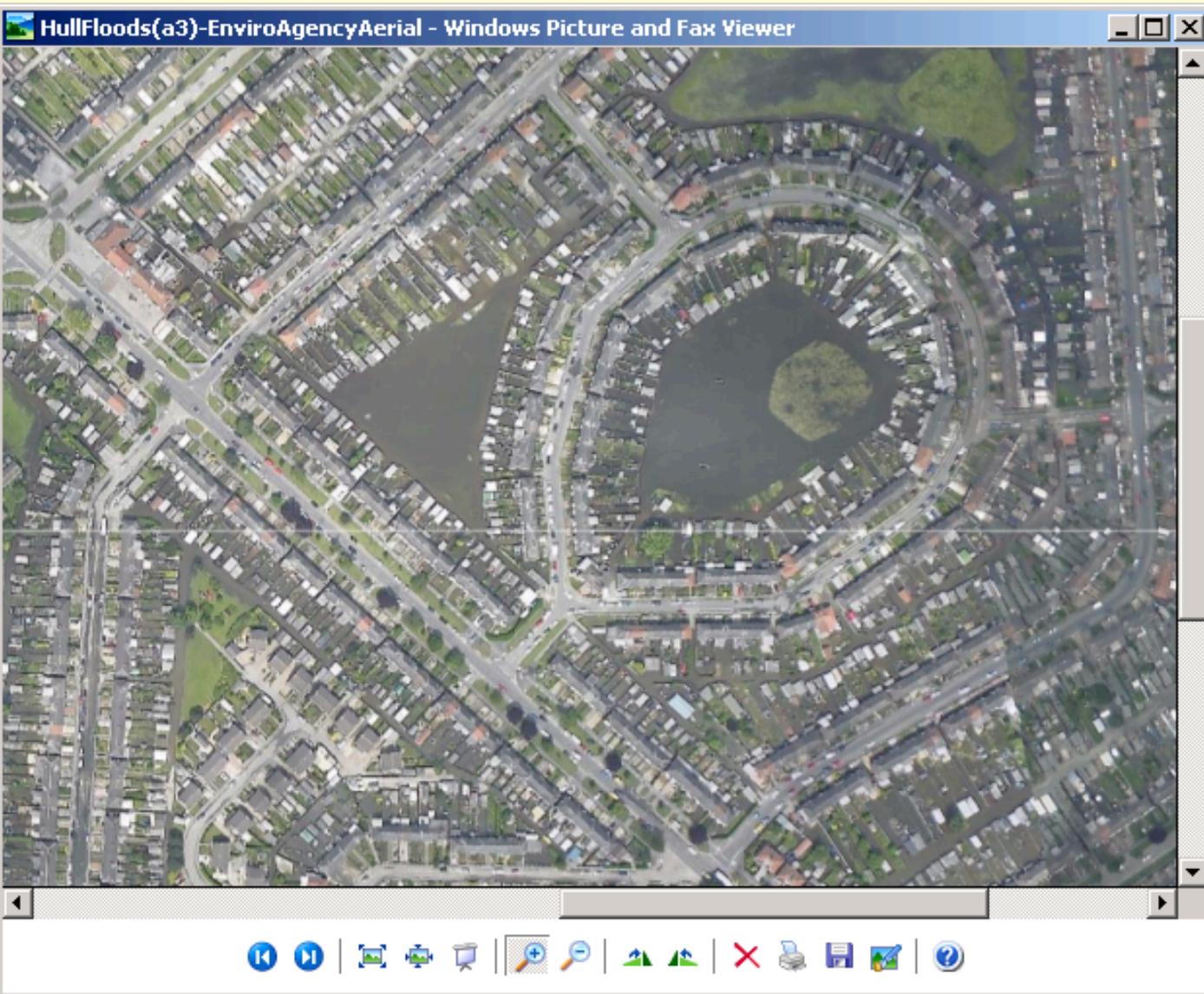




Hull Floods

- Almost 9,000 homes with water ingress
- Over 90% schools closed
- 100s of streets affected
- Around 2,000 calls taken to 300300
(1.5 x avg Mon, 2 x avg Fri)





KuHCC Intranet - Microsoft Internet Explorer provided by ICT & E-Government

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Back Address <http://hcc-097.hullcc.gov.uk:7777/HullIntranet/isw/mapPage.jsp?rand=0.9483498496321513#> Go Links

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Refresh Map

- AREA COMMITTEE BOUNDARIES
- PARLIAMENTARY BOUNDARIES
- CITY BOUNDARY
- SAND BAGS
- EMERGENCY EVACUATIONS
- RISING WATER
- ROAD CLOSURES
- MANHOLE COVERS
- ROAD DAMAGE
- REGULAR BULKIES
- EXPRESS BULKIES
- FLOOD BULKIES
- FLOOD BLACK BINS

Select all Deselect all

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North South

200 Metres

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FLOOD BULKIES
 FLOOD BLACK BINS
 GOLD FLOOD VICTIMS
 SILVER FLOOD VICTIMS
 BRONZE FLOOD VICTIMS
 NO ASSISTANCE REQUIRED
 REQUIRING CLASSIFICATION
 NO RETURN
 FLOODED ROADS JUNE07
 PRIMARY SCHOOLS
 SECONDARY SCHOOLS
 SPECIAL SCHOOLS
 YOUTH CENTRES

Select all Deselect all

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North West South East

200 Meters

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Layer: FLOOD BULKIES

SRN: 4093747
CREATION_DATE: 2007-07-05
UPRN: 000021016856
CUST_ADDRESS: Road
CUST_CITY: Kingston Upon Hull
CUST_COUNTY: null
CUST_POSTCODE: HU5 5XP

Location* = Front Garden
Description Of Items* = carpets and underlay,laminate flooring
White Goods = chest freezer
Additional Information = adv 48 hours adv needs to sign a disclaimer form
Service Failure = n
Outbound Attempts = 0

NOTES:

SR_TYPE: ENV-Bulky Items Coll-Damag Fld
EASTING: 505196
NORTHING: 430032

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200 Meters

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Summary

- Spatially enabling data enriches it
- Oracle Spatial is a good choice for an open system that can handle big volumes
- Browser-based mapping makes spatial data easily accessible and understandable
- This might save your business money – what % of your transactions have a spatial element?

Questions?