

MAKING YOUR DATA COME ALIVE WITH ORACLE DISCOVERER 3.1 AND THE WEB

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The availability of tools like Discoverer 3 places powerful control in the hands of the data administrator to provide a richer data exploration environment. Discoverer's ability to link from the data in the query session to web engines provides a powerful facility for animating the content of the otherwise tabular data presentation. Various freely available web engines can be accessed and exploited with very little effort on the part of the data administrator. By providing these links the user can operate in an environment much closer to their business needs.

Most operational systems for managing the day-to-day business in the ministry is done in very basic character entry mode without linkage to a Geographic Information System (GIS). Over the last 4 years our data warehouse has developed to facilitate desktop integration of these data sources. Much expense and effort is devoted to spatial analysis, after the fact, with sophisticated GIS techniques. Figure1 shows a model used at the Ministry of Environment, Lands, & Parks that highlights some of the drivers and outputs that are tied to the landscape. While the user is simply browsing these data tables the spatial context is often lost or obscured. There is an uneconomical amount of effort just to pose the question "where is it on the map?" One way to quickly place the data on a map is easily accomplished with Discoverer 3 by implementing an HTML browser link to either in-house or publicly available mapping engines over the internet.

By including a few spatial reference tables in your database, data exploration using Discoverer can be made more interesting with the ability to pop up a map of the location that relates to the data being viewed. To put this system into place on your desk top a few pieces need to be installed and working: Oracle Discoverer 3, a web browser, and access to a mapping engine using a web address with the appropriate parameters to generate the desired map. This paper describes the components and their integration into a system that provides a spatial context to your own data.

There are also other web engines that can be used in this manner. Various phone and address finding techniques, so called "411" services, will be shown that will allow the rudimentary information in your database to be enhanced or quality assured.

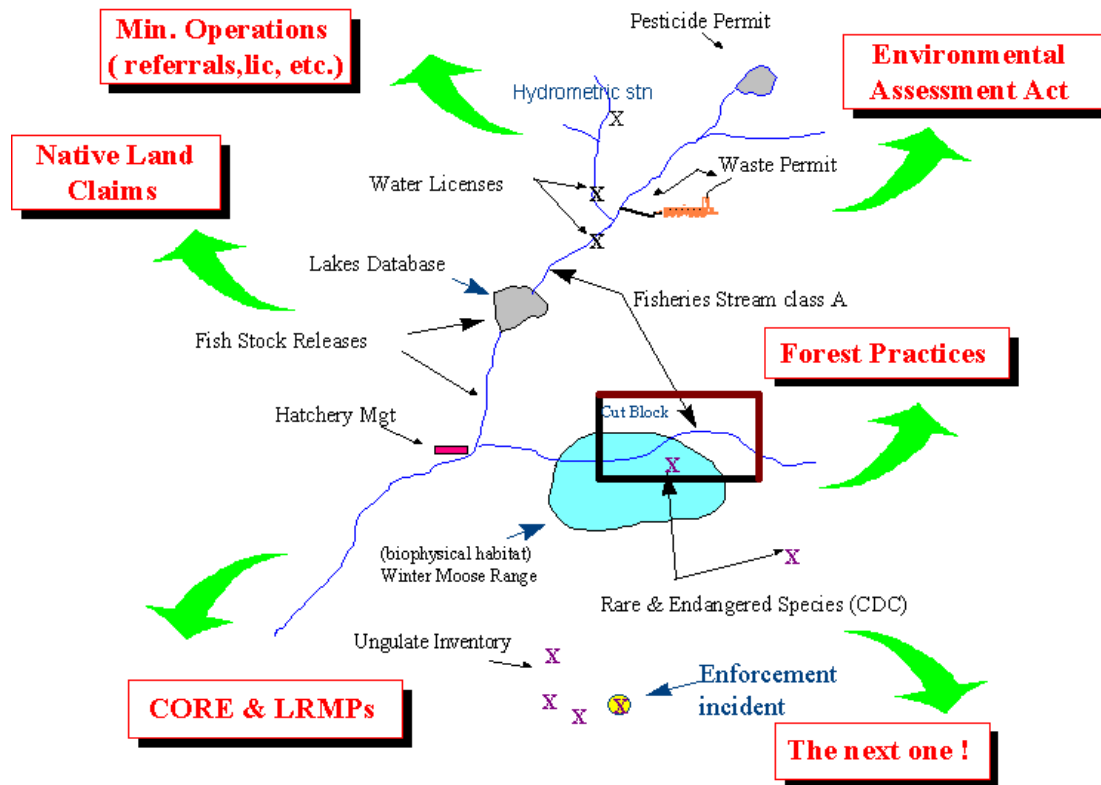


Figure 1. Data on the Landscape, MELP

SYSTEM CONFIGURATION

All development and testing described in this paper was conducted using the following software and equipment.

- Operating System: Windows NT 4.0 (sp3)
- Platform: Pentium 133, 64Mb RAM
- Discoverer 3: Version 3.1.14.99.11
- Database: Oracle7 Server Release 7.3.2.3.0
- Web Browser: Internet Explorer 3.02
- Server: HP-UX 10.20

DISCOVERER 3

Oracle Discoverer 3 is an ad hoc query, reporting, drill/pivot and web publishing tool that allows users unfamiliar with SQL or relational systems, to gain rapid access to the data warehouse allowing them to make more informed business decisions.

There are three main components: the User Edition, Business Analyzer, the End User Layer™, and the Administration Edition shown in Figure 2.

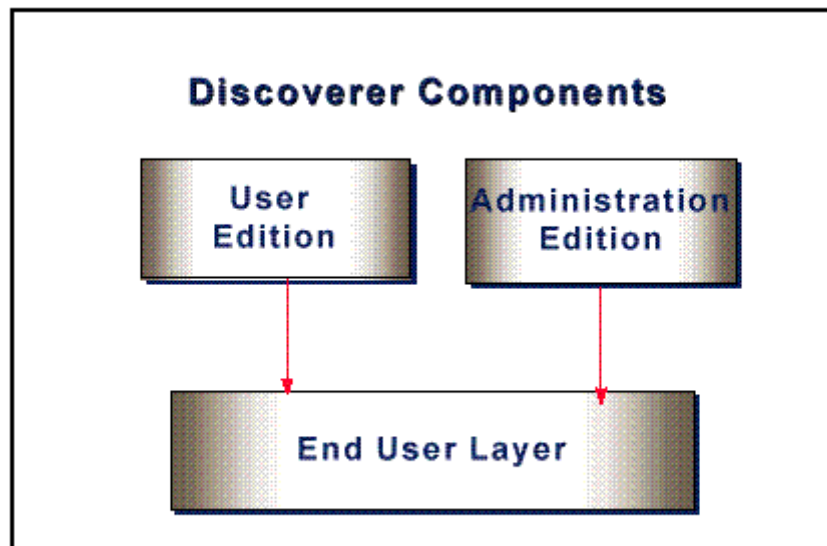


Figure 2. Discoverer Components, Oracle Corp.

The Discoverer Business Analyzer, “user edition”, is the desktop tool which enables users to query the warehouse, create tabular or graphic reports, execute drill and pivot analysis and publish results to the web. The Discoverer End User Layer™ is a server based, meta-layer for providing end users with a business oriented view of the data warehouse. The Discoverer Administration Edition is used for the initial setup and ongoing maintenance of all aspects of the End User Layer™ including the creation and maintenance of business areas, customization of folders and items, summary table creation, and defining end user security control and privileges.

Not only does the End User Layer™ have all the available table/view columns configured as items but it can also have defined calculated fields. These calculated fields can be the result of any simple SQL statement that manipulates the columns in the current row. It is through the creation of a calculated field that a link is built that calls a web engine.

WEB BROWSER

The results will be displayed in a properly installed web browser. Any of the current releases of MicroSoft Internet Explorer or Netscape Navigator are sufficient to link with Discoverer 3. The key point is to have the browser installed so that it is correctly referenced by the data registry under Windows 95/NT. The file reference link from Discoverer will only be recognized if the installation process was cleanly done and the correct data is in the operating system registry. Some map viewers also require extensions to your web browser (plug-ins) that are freely available but require some installation hassle. Newer map viewers and search engines are being deployed on the internet written in Java which have the annoying tendency not to have an accessible calling interface. You must, instead, go through their custom interface screens. This makes them less useful for the web linkage technique described here.

Sites are addressed using a web browser by creating a URL (universal resource locator). Later a number of URLs will be provided with parameters that will execute the 411 search or display the map you want.

WEB ENGINES

The final component of this architecture is the web engine. There are a number of sites on the internet that generously provide 411 services or maps of varying detail that can be displayed by using the URL and the correct parameters. Most of the sites are provided so that you will visit often and read the advertising targeted at you. Organizations that are seriously involved in spatial data may also choose to build and maintain their own map engines. Below is an introduction to some of the freely accessible web sites for mapping and for 411 services. Since these sites are outside

of your organization's control it is possible for the URL link to break at some future time as functionality changes or the service ceases to be offered.

411 SERVICES

Searching for people and business's e-mail, telephone number and addresses of the internet comes under the general heading of 411 services. ('411' being the North American standard phone company provided dialing sequence for directory assistance.) There are several web engines available that provide 411 services. There are three examples of web 411 engines given below, two for the United States and one for Canada.

WHOWHERE

Lycos, the company that runs one of the largest web page search engines on the internet, has a simple 411 look up facility. By passing the correct URL it will return phone number information. For the Chairman and CEO of Oracle corporation the syntax looks like this:

```
http://phone.whowhere.com/telephone.psrch?f-name=L&name=Ellison
```

It returns a number of entries, one of the likely (but unconfirmed) candidates with the correct middle initial being:

```
L J Ellison
Phone : 209-545-4261
CA 95350-0000
```

The call interface is unsophisticated not allowing a geographic qualifiers or the inclusion of a middle initial in the search parameters.




SWITCHBOARD

The call interface for Switchboard is much more sophisticated. Repeating the search above but including Larry's middle initial and restricting the responses to California the syntax looks like this:




```
http://www.switchboard.com/bin/cgiqa.dll?F=L+J&L=Ellison&T=&S=CA&SR=&MEM=1
```

The results return three possibilities as shown in the figure 3. with the added touch that there are web links to order flowers or gifts for him.




Listings 1 - 3
[Modify Search](#) | [New Search](#)

Ellison, L J [CARD](#)   FLOWERS [Send a Gift](#) 

Modesto, CA 95350
[Phone, Email, Maps and More...](#)

Ellison, L J [CARD](#)   FLOWERS [Send a Gift](#) 

Palo Alto, CA 94301
[Phone, Email, Maps and More...](#)

Ellison, L J [CARD](#)   FLOWERS [Send a Gift](#) 

San Mateo, CA 94401
[Phone, Email, Maps and More...](#)

Figure 3. Switchboard search results

CANADA411

The Canadian search site provided by Sympatico has a very flexible call interface. The syntax for looking up the author's phone and address information is:

```
http://canada411.sympatico.ca/scripts/english/tname.exe?lastname=Faulkner&firstname=Andrew&citytown=Victoria&province=British+Columbia&row=0
```

This returns complete telephone number and address information.

WEB MAP ENGINES

There are two examples of web map engines given below that provide complete North American coverage. Others are available that provide mapping for specialized purposes or limited locations. Some of these may require a web plug-in to be downloaded before they are usable by your internet browser.

XEROX PARC

```
http://pubweb.parc.xerox.com/map/
```

This map viewer is the granddaddy of internet map viewers. It is provided by the Xerox Palo Alto Research Center and has a straight forward interface pleasantly lacking in blatant advertising. Its best feature is the ability to draw up a map consistently and place coloured marks on it indicating points of interest. To use this map engine, however, you must have coordinates in latitude and longitude. Help on constructing the proper URL syntax is found at:

```
http://pubweb.parc.xerox.com/mapdocs/mapviewer-details.html
```

Here are some examples of what is possible taken from their help pages:

```
/map/color/mark=37.40,-122.14;21.35,-157.97
```

Specifies marks for Palo Alto, California and Pearl Harbor, Hawaii.

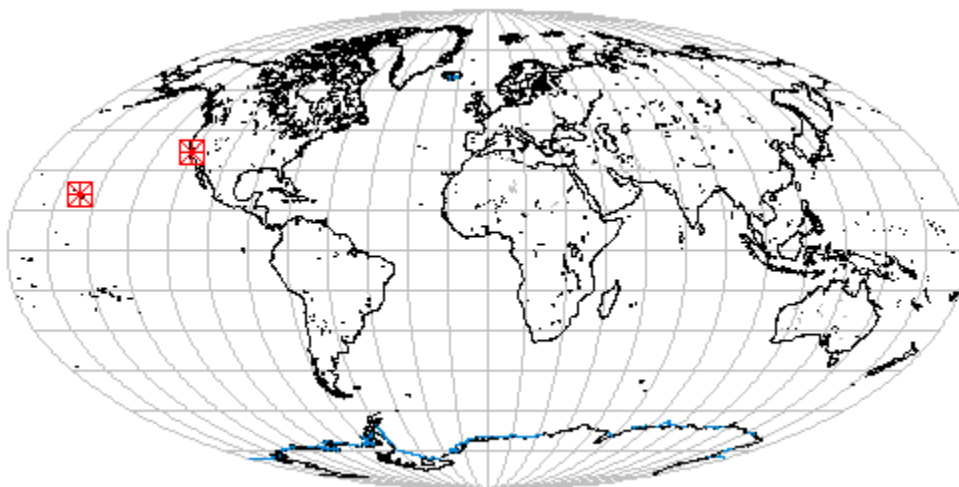


Figure 4. Xerox PARC map

MAP BLAST

<http://www.vicinity.com/>

This map generator does not require any knowledge of latitude and longitudes working directly from city, state (or province), street or intersection address. So if your database has true address information in it and the need is to present a map pin pointing the site this is a good choice. In addition Map Blast can provide driving instructions of how to get from one point to another and total distance.

The URL to locate Oracle headquarters looks like this:

<http://www.mapblast.com/yt.hm?CMD=GEO&FAM=mapblast&SEC=blast&IC=0%3A0%3A8%3AOracle&CI TY=Redwood+City&STATE=CA&AD2=500+Oracle+Parkway&AD3=Redwood+City%2C+CA&AD4=USA&GMI=1>

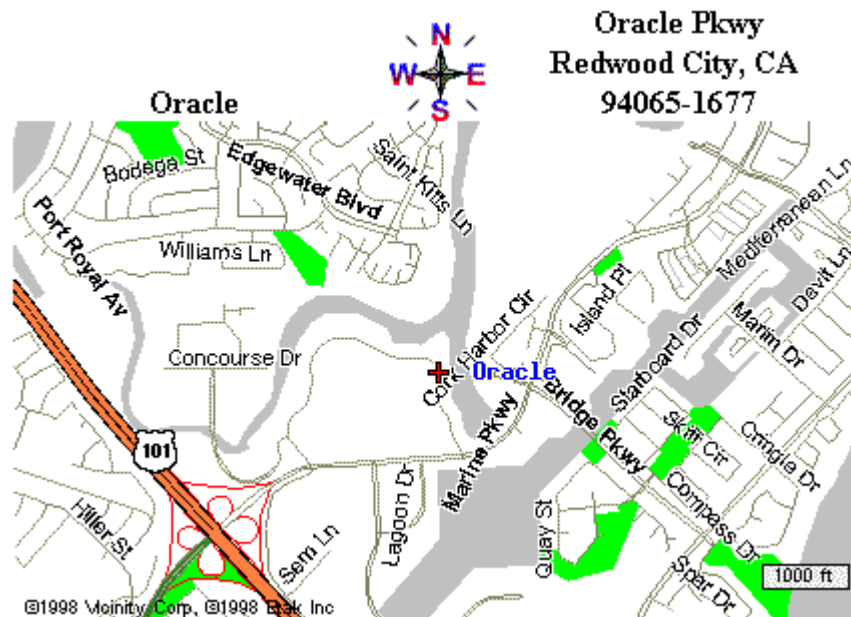


Figure 5. MapBlast map

PUTTING IT ALL TOGETHER

Now we have our component pieces: web engines on the internet to perform a desired function, a web browser, and Discoverer 3. The final step is create the well formed URL with parameters that will call the web engine and display the results in our web browser. The link between Discoverer and the web browser is a calculated field that is created in the Discoverer Administration Edition. Outlined below is an example of adding a spatial link to your Discoverer session so that a map related to the data is presented. This technique can be used to create any of the URLs given in the example engines above.

1. Using the Administration Edition, open the Business Area.

The Business Area must have a spatial reference in it. This could be either a street address or coordinates given in Longitude and Latitude as we see in the following example.

2. High light the folder containing the spatial reference.

In our example the folder Place_Names has the fields Decimal_Latitude and Decimal_Longitude fields.

3. From the menu Insert/Item or press the button on the icon bar.

In this New Item the calculation to form the URL will be defined.

4. Name the New Item something meaningful like “Map”.

5. Write the SQL to concatenate a character string that forms the correct URL.

This is best done in a separate notepad and pasted into the editing space provided. Test the SQL first in SQL*Plus or by creating a “Defined Column” in the old Discoverer/2000 product.

Here is the SQL to create the Xerox Parc map viewer URL from a database having the columns “decimal_latitude” and “decimal_longitude”.

```
'http://pubweb.parc.xerox.com/map/color=1/features=alltypes/ht=2.24/iwd=256/lat=' || TO_CHAR(decimal_latitude) || '/lon=-' || TO_CHAR(decimal_longitude) || '/mark=' || TO_CHAR(decimal_latitude) || ',' || TO_CHAR(decimal_longitude) || '/wd=4.50'
```

I deal primarily with Canadian coordinates for which the default map “World” is the only one available at Xerox PARC. For coordinates in the United States add the parameter ‘/db=usa’ to see a much richer set of cartographic features.

6. Edit the properties of the new item making sure to change the “Content Type” to FILE.
7. Use it in a worksheet with the Discoverer 3 End User tool.

Select your “Map” field as one of the display items.

After formatting foreground and background colors the worksheet displays as shown in Figure 6.











Page Items: District Name: SOUTH VANCOUVER ISLAND ▼			
	▶Park Name	Map	▶Desig Area Name
▶1	CARMANAH WALBRAN		CARMANAH BACK COUNTRY
▶2	CARMANAH WALBRAN		CARMANAH BACK COUNTRY
▶3	CARMANAH WALBRAN		CARMANAH BACK COUNTRY
▶4	CARMANAH WALBRAN		CARMANAH BACK COUNTRY
▶5	CARMANAH WALBRAN		CARMANAH BACK COUNTRY
▶6	CARMANAH WALBRAN		CARMANAH BACK COUNTRY
▶7	COWICHAN RIVER		COWICHAN RIVER CAMPGROUND
▶8	COWICHAN RIVER		COWICHAN RIVER DAY USE AREA
▶9	GORDON BAY		GORDON BAY BOAT LAUNCH
▶10	GORDON BAY		GORDON BAY CAMPGROUND

Figure 6. Discoverer worksheet with map web link

The Netscape explorer symbol appears in the “Map” column. By formatting the column text to be white on a white background the messy URL information disappears leaving only the symbol.

Clicking in the map column beside a park name invokes a web lookup to the Xerox Parc map server resulting in the following image for “Carmanah Walbran” with the boxed cross centred on the park.

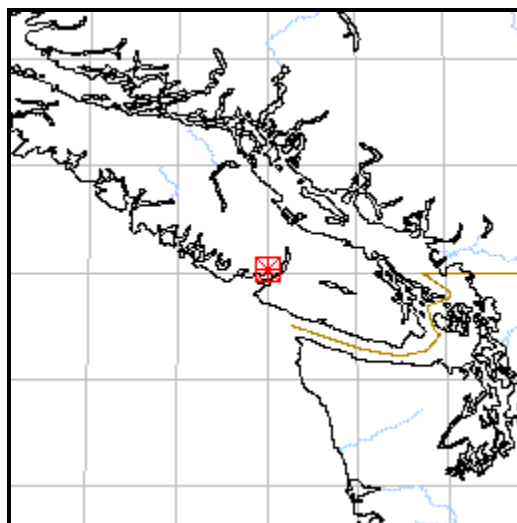


Figure 7. Xerox Parc Map output from Discoverer link

ADDING SPATIAL TO YOUR DATA

To make this all happen you need a spatial reference of some kind. To use MapBlast the spatial reference is as simple as the standard street address information that exists in your current database. Other mapping engines, like Xerox PARC, require a decimal latitude and longitude to be available in your database and be passed as parameters in the URL. Fortunately there are a number of ways to acquire coordinate data. Hand held Geographic Positioning Systems (GPS) can be used to collect accurate points for sites of particular interest. It is important to note that public map servers are not that accurate at detailed scales so you can probably read specific coordinates off a map and hand enter them. For bulk loads there are a number of sources available for free and low cost download from the internet.

In the United States, the Geographic Names Information System (GNIS) contains name and locative information about almost 2 million physical and cultural features located throughout the United States and its Territories. They can be downloaded at:

<http://mapping.usgs.gov/www/gnis/gnisftp.html>

Aviators require accurate GPS coordinates for establishing way points during flights. A number of data banks are available that feature airports and flight navigation marks and even an organization that is collecting and indexing them:

<http://www.waypoint.org/>

CONVERTING SPATIAL DATA

A number of sources provide spatial data in the form of Degrees, Minutes, Seconds which is a problem when the map servers accept only in the format of Degrees and fraction of degrees, commonly called decimal degrees. The SQL conversion are as follows:

```
ROUND(FLOOR(longitude/10000)+FLOOR(MOD(longitude,10000)/100)/60+MOD(longitude,100)/3600,5)
```

```
ROUND(FLOOR(latitude/10000)+FLOOR(MOD(latitude,10000)/100)/60+MOD(latitude,100)/3600,5)
```

Where Latitude and Longitude are numeric Degree-Minute-Second values having the format 'dddmmss'. The result is rounded to 5 decimal places.

CONCLUSION

The technique presented here allows Discoverer 3 users to exploit the resources of the world wide web. The ability to message freely available web engines produces custom maps to animates the basic tabular data with a spatial context or provide 411 information. All that is required is that the parameter data for the URL be placed into the appropriate syntax by a string concatenation statement into a calculated item, the item content type is set to "FILE" and Discoverer does the rest.

Oracle's Network Computing Architecture (NCA)

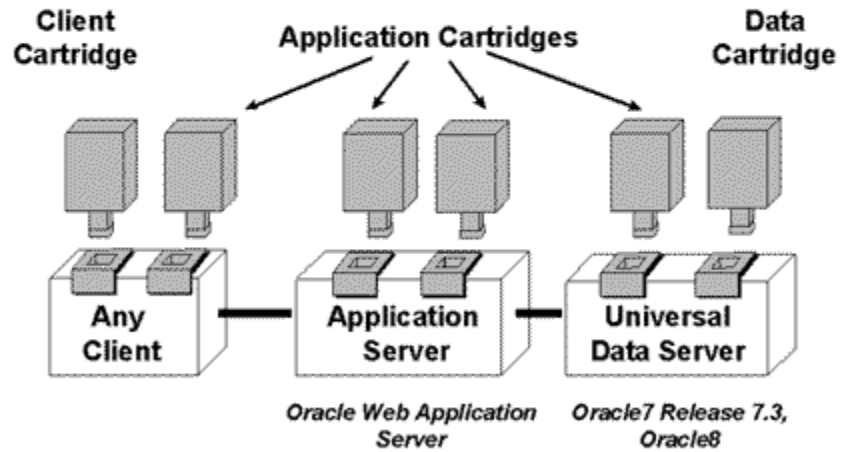


Figure 8. NCA, Oracle Corp.

Not only does this demonstrate the immediate usefulness of a networked world but provides a glimmer of where the Network Computing Architecture (Figure 8.) is heading. The data resides in the database server (Oracle), a client (Discoverer 3/Web browser) manipulates the data and calls through a standard protocol (HTML) to an application server (map engine.) The release of Webdiscoverer will make this implementation seamless with all the client side activity conducted in the web browser.