

# **D-MAP**

***Visual Data Synthesis***

## Table of Content:

General Information: .....	3
Data-Mapping Examples: .....	3
Distributed Application: .....	4
Open Architecture: .....	5
Virtual Earth Model:.....	5
Development Requirements: .....	5

## General Information:

Lack of a comprehensive geographical reference system on the Internet served as a source of inspiration for seeking a new approach in information indexing and subsequent Internet deployment. Tackling this as a non-immediate-profit task, author was able to devise a series of abstract algorithms for definition of objects on flat surfaces, such as computer screens, and for providing necessary programming logic toward the practicality of computer platform deployment.

Information definition and indexing approach described below uses the main concept behind HTTP protocol, which allows for definition of one document to be composed from bits of information stored in different locations. The indexing engine itself serves as a synthesizer of visual information derived from the indexed data sources.

Today, web documents can be, and often are, built with information derived from various data-providers, such as news print, photos, advertisements, etc. The matrix data synthesis system, henceforth *D-Map*, uses the above HTTP protocol concept to compose images, or pixel matrixes, on Internet users' computer screens where a natural number of single pixels or collections of pixels on the image represent independent objects within the aggregate collection of the matrix's pixels.

Composed matrix looks like any regular Gif or Jpeg image to the end user. However, with the inherent ability of a pixel to behave as an independent data and logic enabled *object* it becomes possible to compose images from information derived from virtually unlimited in numbers and complexity data- and logic-providers and allow for visual, high-level interactivity between objects derived from different in type and content physical and/or logical entities.

## Data-Mapping Examples:

The D-Map matrix, like any other image or map, consists of pixels with coordinates  $x$  and  $y$ . Traditional mapping techniques use a method of mapping objects representing flat structures and communication links onto a pre-prepared, or pre-drawn, low-level map. Every structure is then assigned an  $x$ - $y$  coordinate (communication links are usually given vectors). Fundamental difference of the D-Map system is that the map is represented by an aggregation of objects, such as polygons or surfaces for structures and vectors for communication links, without the necessity to be tied in to the main low-level map and with the ability of every object to function independently.

As this technology is intended to be web-deployed, it potentially enables for data feed of any type from any content provider to be supplied to an unlimited number of locations on the map.

A live news report, for example, may contain local or world map with live events taking place in one spot or another on the map. Every type of event is categorized by type and represented by a different color on the map. User may then select and click the location on the map he or she is interested in. This would in turn direct him or her to a specific content provider for more event-related information.

Any and all events that have taken, are taking, or are planned to take place on the map are stored in a special database for lookup and cross-reference. Please refer to two possible scenarios below:

### Scenario 1:

You are looking for a place to stay in an unknown to you area. An apartment on ABC St. suits your needs and is within your price-range. As you are looking at the location of the apartment building on city map, D-Map allows you to instantly look up the following information:

- Shopping and Services Database:  
where and what are the nearest supermarkets, dry-cleaners, sport clubs, restaurants, bars, etc.
- Traffic Database:  
statistics on traffic jams, road construction work, parking, motorists' opinions of the area, available public transportation.
- News Event Database:  
crime rate (for your building and the vicinity), special events (past, present or planned), public gatherings.

- Telephone Directory Database:  
who would be your neighbors?
- Municipality Database:  
what development and construction projects are planned for the vicinity?

### **Scenario 2:**

Financial figures of a hotel chain X show decline in profits during summer months in resort complex A, but a sharp raise during fall season in complex B. By referring to the locations with the help of D-Map, it may be then be determined that a manufacturing plant near resort A was shut down in late spring, leading to high unemployment and unrest in local population creating unfavorable travel conditions. In the vicinity of resort B, in accordance with the local registry database, local population was celebrating a folk festival creating attractive tourist destination.

### **Conclusion:**

Since there is no technologically imposed limit on the quantity and quality of data indexed onto D-Map, list of possible application usages may be expanded to an virtually unlimited number of activities; such as market forecasts, area satisfaction ratings, weather conditions, geographical sales and corporate profits reporting, improvement of distribution systems, traffic rerouting, city planning, communication links development, optimization of cargo shipping and pollution monitoring.

### **Other possible usages:**

- HTML Television:  
As bandwidth becomes more readily available, D-Map may be utilized for broadcasting live and/or frame-by-frame video in digital format over the Internet.
- Mathematical Modeling:  
Coupled with existing mathematical models, D-Map may provide for visual broadcast of modeling processes and enable scientists from remote locations to facilitate the process by way of correcting the central data processor with feedback of newly discovered phenomena. *Coupled with robotic arm instruments this could lead to new frontiers in semiconductor manufacturing.*
- Games and VR:  
D-Map system should be able to provide a flexible and commercially viable platform for game and VR engine developers.
- Graphical User Interface:  
The same concept of synthesizing images from objects whose attributes are stored in relational tables may be applied to creating computer operating systems' GUI, enabling software manufacturers to quickly create custom program controls for their products.

### **Distributed Application:**

The D-Map system would be built in accordance with the Distributed Application Architecture concept, which provides for the main application engine to be hosted on one server cluster and have one or multiple Internet addresses for end-user access. Application developers and data-providers are in turn given facilities to conduct independent application development and data-feed to the application databases.

With inherent scalability of distributed application architecture structure as quantity of applications and size of databases grows, replication of the main D-Map system engine over several strategically placed server hosts may be implemented. Strategically balanced level of redundancy with procurement of additional servers may be achieved.

Centralization of the main system engine, while being technologically necessary, provides a serving need requiring any commercial, non-profit, or government organization to achieve some type of agreement with the owner of the D-Map engine system prior to commencement of a database population or, on a more practical side, application development project.

Ability to have a controllable facility for information indexing may allow for new possibilities in reducing information pollution, whose issue is beyond the boundaries of this paper.

## **Open Architecture:**

Given nature of the system in question, author believes that it would be in the best interests of successful system deployment to initiate development process in a non-profit or academic environment, in the likes of a Research Institute or a University.

Initial development stage in an R&D environment should take anywhere from three to six months, after which the system would be able to show viable results. At that point future R&D process and real-world application usage of D-Map may be revised.

With potentially wide-ranging application field of D-Map, author believes that a premature commercialization of the system would have a negative effect on its future, as it would impede diversification into various fields of activity that might otherwise benefit from its technological and performance advantages.

Furthermore, author believes that after D-Map becomes technologically feasible a non-profit organization or company should be created and tasked with administrative and business development of the system as well as be charged with responsibility of finding new data-providers, expanding application usages, furthering technical capabilities, and finding new real-world and business applications for the system.

Licensing fees from companies willing to utilize the system engine for commercial purposes may be collected. Advertising, partnering and promotional offers, however, should be considered very carefully as they might have a negative effect on the spirit of Open Architecture Concept.

## **Virtual Earth Model:**

It is solely author's own opinion that one of the greatest benefits for Internet users everywhere provided by this system would had been a comprehensive world map with continuously updated data on the scale from local community-related information (local businesses, news events, building condition information, traffic updates) to world-map view (global climate, world news reports, political maps, economic, demographic, military and ecological situations).

As it is obvious that creating a database with continuously updated information of this scale would require involvement of a certain number of research institutes, non-profit organizations, governmental institutions, private businesses and other data-providers, and as a practical approach, development of D-Map should not and would not be centered around creation of the *Virtual Earth Model*, as it is clear that a data-model of this scope would not become a reality in the nearest foreseeable future.

## **Development Requirements:**

Development of the D-Map system, as with most Internet-deployed systems, would involve the following three steps:

- Data-Model development and creation of Database Structure
- Application Engine
- Client-Side Browser Plug-In and/or Java applet

As it is the case with virtually all database supported systems, development of data-model would be the first crucial step in development of a flexible and adaptable architecture for D-Map. Creation of a solid database foundation insures successful future development process and adaptability to changing real-world and business application needs.

Once a unified system database structure is defined and hard-coded, developers with various backgrounds may proceed with development of facilities for data population and retrieval. In parallel with development of data-population facilities development of the Main Visual Data Synthesis and Session Management Engines for serving client-side end-user applications will commence.

Although today's Internet browser object model (IE, Netscape, etc.) contains the necessary facilities for implementation of a workable solution to support D-Map, author deems it necessary to provide a custom-made client-side browser plug-in or, less likely, applet utilities for running on client machines solely for performance reasons.