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ILLUSTRATING POWER STRUCTURES

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ILLUSTRATING POWER STRUCTURES

Abstract

With increasing amounts of surveillance, bureaucratic organizations coordinating data accumulation, and mediation of computational systems, the flow of data has become unidirectional into the control of those in positions of power. The intention of this thesis is to propose a method of augmenting an individual's ability to organize and illustrate data about the networks of larger institutions and powerful indviduals which influence their daily life in an attempt to shift the balance of power towards an increase in social justice.

Power Structures is an online system for illustrating the networks of power brokers that influence our daily lives. Participants are invited to contribute data about people, places, things, events, groups, and the relationships that tie them together. The maps produced act as narrative structures outlining the flow of influence.

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This project is dedicated to the memory of Mark Lombardi and Gary Webb, who gave their lives in the pursuit of truth.

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1 Introduction

1.1 Knowledge as Power

As the capabilities of technology develop at an exponential rate, more and more of our daily life becomes mediated by computational systems. Various bits of information collected about us, our activities, and our interests, have been broken down into easily categorized pieces of data. This data is preserved digitally in relational databases, ready to be sorted, mined, utilized, and potentially abused by whoever has access.

As we have transitioned to a predominantly post-industrial society, information has been transformed into a commodity. The collection and management of data is big business these days, and is fueled by the commercial necessity for better understanding. This necessity is driven by the quest for greater profit margins. Any organization has a vested interest in having a better understanding of the systems around it which influence the success of its operations and insure its well-being.

Until recently the ability to collect, manage, analyze, and visualize large quantities of data was reserved for corporate or government institutions with the capital for new technologies and the man power to implement them. These organizations have a lot to gain from the collection of data, and a lot to lose if they don't. A corporation can sell more of its product if it is knowledgeable of the key demographics that the consumers purchasing their products identify with, and shift their advertising accordingly.

Individuals are rarely capable of mastering the expansive knowledge bases and skill sets required to construct such systems. However, they have just as much of a vested interest in collecting, managing, analyzing, and visualizing data relating to these larger organizations, whose vast amount of influence and control has a great impact on their lives. This interest is of a different sort, where they are not concerned with profit margins but rather the way these larger powerful institutions operate at the expense of the individual.

With my thesis project Power Structures, I propose to augment individuals by giving them the capability to collectively research and organize power structures and networks of influence. Much information about the organizations and individuals with high seats of power is freely available, but obfuscated, either intentionally or

unintentionally through its distribution. Power Structures allows the user to take on the role of a journalist, and seek out citations relating to their subject matter. By amassing a wealth of published material, they can use it to connect relationships between characters in their narrative structure. When people come together to attempt to shed light on powerful individuals and institutions, they can share their knowledge and perspective, and influence their community in future decision making. This augmented ability for the individual would tip the scale of power towards an increase in social justice.

George Orwell foretold a dystopic future in 1984 where surveillance was omnipresent, media history was systematically erased, and people lived in fear of enemies far from home; a not so distant scenario to contemporary living. Bureaucracy is an essential component to any functional society. It's necessary for the coordination and administration of organizations in order for them to run properly and effectively. However, bureaucratic systems require the collection and management of data to operate. The larger our society gets, the more of a necessity for systems of management, driving the further implementation of bureaucracy. Since these systems have become ubiquitous, they are inherently effective modes of surveillance.

Christopher Dandeker, a professor on military sociology at Kings College in London, states in his book *Surveillance, Power and Modernity* (1990), "The members of modern societies, as products of an individualistic tradition, are increasingly dependent on bureaucratic organizations which can subject them to detailed administrative control and gather information about their lives."[1] In addition, Herbert Marcuse states in his book *One-Dimensional Man* (1962), "Today political power asserts itself through its power over the machines process and over the technical organization of the apparatus."[2]

1. Dandeker, Christopher, **Surveillance, Power and Modernity** (Cambridge: Polity Press, 1990), 2.

2. Marcuse, Herbert, **One-Dimensional Man** (Boston: Beacon Press, 1962), 3.

There is really no way to counter these forms of surveillance other than dropping out of these bureaucratic systems entirely. By not providing information about ones self, one can stay out of these systems, however doing so results in withdrawn participation from societies benefits. Sometimes not providing information to a government institution is a crime.

The only way to "counter" this type of surveillance is by inverting it. This involves turning the methods of data collection and management around on the people doing the surveillance. When the roles of the watcher and the watched are reversed, a power shift occurs. This gives the watched knowledge of their watchers activities, and can

hold them accountable for them.

Naturally, such surveillance networks are out of operational control by the individual, but rather are implemented by large institutions requiring the management of complex systems. The individual is left without the ability to implement surveillance techniques through bureaucratic systems of their own, and thus must find other methods.
Individuals must learn how to leverage the vast amounts of data already available to them through the Internet, public archives, and even mainstream media. There are further untapped resources such as the deep web and mash-up technologies that help lead to data pairing, making analysis much more meaningful and multi-dimensional. The issue is not that the data is unavailable, but that the data is obscured or convoluted in the way that it's presented and distributed.

The collection of data comes with certain epistemological concerns. How accurate is the data? Does the data come from a reliable source? How complete is the data? These are questions everyone asks when they try to shape their perception of the world around them based on the information they receive and treat as knowledge. This is exemplified through the primary, secondary, and tertiary classification system of published material for citations.

With the surge in user created content being uploaded and distributed through the Internet, the variety of sources for our information has increased dramatically. One person may be blogging about a subject matter while another is uploading home edited videos about the same subject to YouTube and another is transmitting messages about the subject to their colleagues through a social network. Is any form of media more legitimate than the other?

The epistemological upside to the varying methods of public forum is the increase in narratives being developed to tie disparate sources of information together. These are not only secondary sources of information on a subject, but primary sources of new ideas and investigative knowledge being developed. Utilizing this eclectic mix of sources relates to the idea of epistemological anarchism put forth by Paul Feyeraband, which is opposed to all systems of rules and constraints in scientific research.[3] In this manner, researchers can remain opportunistic and creative when it comes to their ideas.

When one decides to implement a method of inverse-surveillance, they are looking at shifting the scales of power through knowledge. For a significant shift in power, the surveillance must be turned

3. Godfrey-Smith, Peter, **Theory and Reality** (Chicago: University of Chicago Press, 2003), 110.

around towards the already powerful. By mapping the power structures that influence ones life, it becomes more apparent where there is a need for change. Analyzing networks of influence can untangle the web of misinformation and disinformation coming from public relations, advertising, propaganda, and the many other forms of control which are used to obfuscate the public's knowledge of the inner workings of corrupt and/or unethical activities.

Power works similarly to money. The more money you have to begin with, the greater amount of capital you have to invest in order to continue to accrue more money. The same goes for power. In an economy where information is equivalent to currency, it's apparent that large bureaucratic organizations have amassed a great amount of wealth. When that information is directly applicable as capital in increasing an organizations knowledge management and analysis capabilities, the more power they are capable of amassing.

The individual has little or no capital to work with financially, data wise, and power wise. What can be done to augment the individual's capabilities in acquiring information and therefore power? The individual must be altruistically empowered by some capabilities to organize and visualize the information around them. Various efforts have been made to combat this issue, such as the visualization tools provided by ManyEyes and the data organization and distribution by Swivel. This is accompanied with the collaborative addition of information through Wikipedia, and the collective and free-form data modeling of FreeBase.

While all of these tools help the individual's ability to process information, none of them are designed to help deconstruct networks of influence and power structures. In an attempt to fulfill these needs, I have developed a prototype of a social software platform for the visualization of these power structures. The project utilizes and adapts the visual language and data modeling techniques of Mark Lombardi's Narrative Structures to a hypermedia system. The addition of interactivity and a relational database allow for dynamic content, community moderation, and easier accessibility to related information.

1.2 How it Works

Power Structures intends to focus on the amalgamation and visualization of bits of published knowledge in order to create easily distinguishable network maps of influence. The project does not intend to augment the individual's ability to locate or gather information, but rather informs what to do with it after they have

found something interesting. The project is reliant on the individual's interest in a particular topic and their ability to seek out these interesting bits of information.

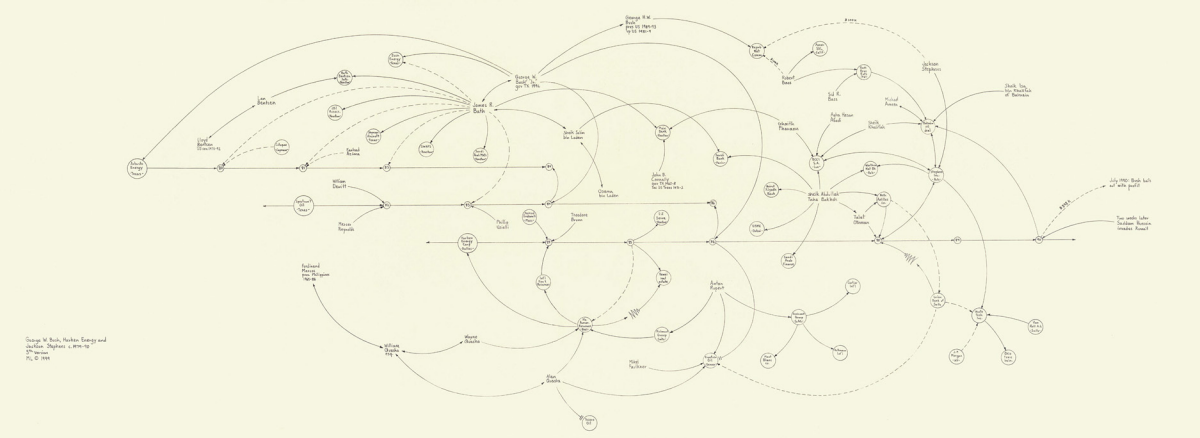
In order for a user to begin an investigation, they will usually either start with a topic in mind, a particular item to begin with, or a source of published information that sparks their interest to further research. From this point, the user begins to add data items to the system. The importance of adding data items initially is to create a catalog of elements for the user to build relationships off of. This is crucial in order to create relationships between them.

The relationships are created by referencing a type of relationship in a particular citation. A user may be reading a newspaper, or a web site, or a blog, and find an interesting reference about a relationship between two data items. This published material is used as a citation to create a specific relationship between the two items. In this manner, all relationships that are entered into the system will have at least one point of exterior reference. This will lead to further verifiability of the information presented as well as an aspect of accountability for the contributor. As networks of influence develop through the intersecting relationships of multiple items, the complexity of these power structures arises as a visual graph.

Hierarchies are most commonly associated with power structures, as it is an easily managed, top-down system of control in which the delegation of power becomes diffused through the pyramidal distribution of management. Ultimately, all control eventually funnels down from the top, and all the resources and power are elevated and concentrated towards the top. There is a slight issue though, in that hierarchies are not always an appropriate method for analyzing power structures. A more non-linear approach needs to be taken when it comes to mutually beneficial relationships, which are often times not as obvious as the well documented hierarchies of powerful organizations.

Following the cartographical techniques of Mark Lombardi, the Power Structures project utilizes non-linear mapping techniques to allow for not only the creation of narratives illustrating a series of actions over time, but also the distribution, organization, and concentration of power. This system is used to help facilitate the investigation of subject matters that are usually not, if ever, covered by mainstream media sources.

2 Related Work



George W. Bush, Harken Energy, and Jackson Stephens, ca. 1979-90 (5th Version) 1999, 24 1/8 x 48 1/4 in. by Mark Lombardi

2.1 Within the Arts

2.1.1 Mark Lombardi's Narrative Structures

Mark Lombardi majored in art history at Syracuse University, and was employed as a researcher while he did his undergraduate work. This is where his passion for investigation began, and led further to the development of his writing, in both the fields of art history and investigative journalism. While he was researching for his book *On Higher Grounds: Drugs, Politics, and the Reagan Agenda*, he began to draw diagrammatic network structures to get a better understanding of the complex systems he was unraveling. As he began to refine these Narrative Structures, as he referred to them, they took on a unique quality of their own that made them not just a brainstorming exercise towards writing a book.[4] The role of information design and the aesthetic qualities of his structures became more relevant as his revisions evolved, and this attracted the arts crowd.

4. Hobbs, p. 24.

Although his Narrative Structures can be enjoyed purely for their visual aesthetic, the underlying subject matter makes them far more interesting. Lombardi would outline the narratives occurring within corporate and political crimes, and connect the power brokers involved in these nefarious wrongdoings. His research was represented in the most minimal manner possible, with simple nodes representing people, events, or organizations, and the

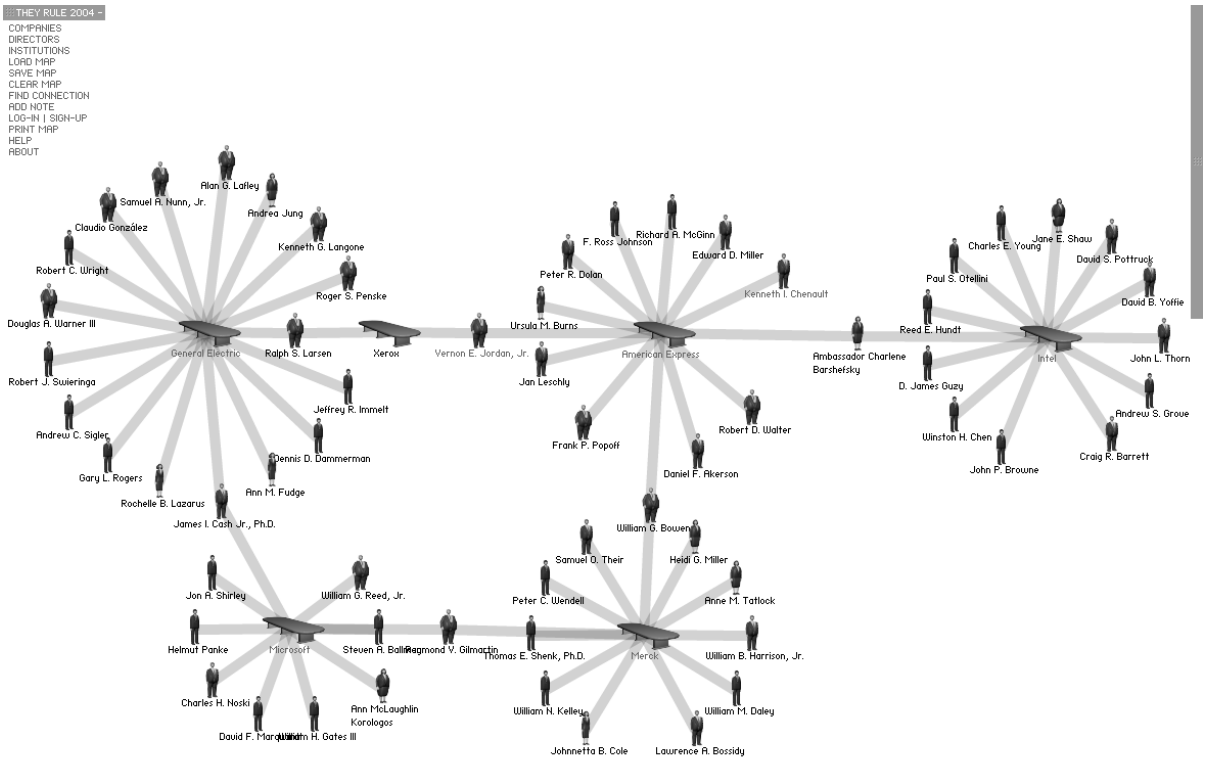
gentle curves connecting them into spherical clouds. There was no in depth revealing of the types of relationships other than being mutual, influential, financial, and the like. This leaves many viewers wondering what his primary sources of information were for these structures, and what the exact relationships may have been.

Lombardi was an avid follower of the work of Edward Tufte, particularly his book Envisioning Information (1990).[5] Tufte emphasizes an analytical design philosophy based on the pre-attentive retinal variable research of Jacques Bertin. This philosophy relies on stripping visual representations of information down to only the most essential elements to more clearly fulfill the goal for analysis. Lombardi's use of subtle beige paper with only black and red graphite was no doubt spurred by this sort of visual thinking. Lombardi played with the arrangement of items to emphasize their importance in the over all structure.

5. Hobbs, p. 43.

Lombardi's career in the art world lasted a short six years, when at the height of his popularity, he was found hanged in his apartment on March 22, 2000.

They Rule, 2001, by Josh On



2.1.2 *Josh On's They Rule*

TheyRule.net was originally launched in 2001 as an interface to a database of the top 500 companies' board members. The site uses a similar method to Lombardi's work where the only nodes are boards or board members, and the relationships created between them simply illustrate a person's membership. The interesting aspects come from the creation of maps that further investigate the connections between companies due to board members sitting on more than a single board.

The site also allows for some functionality that takes advantage of the database structure, such as entering companies and seeing how many nodes it takes to connect them. In addition, using dynamic visual software allows the investigator to refine the organization of their narrative structure much more rapidly than doing so on paper, or even a white board. These are things that Lombardi could not take advantage of with his work. The benefit of the technological application of these techniques is their ability to co-exist. The structures created on They Rule are easily distributable online, but they can also be printed.

Selected CIA Aircraft Routes and Rendition Flights, 2001-2006, 2006, by Trevor Paglen and John Emerson.

2.1.3 *Trevor Paglen's Selected CIA Aircraft Routes and Rendition Flights*

Trevor Paglen works in a variety of mediums to interpret hidden networks and systems that work around us. These range from the California prison system to extraordinary rendition.[6] All of Paglen's work relies on intensive investigative research and documentation of evidence.

This particular work was a collaboration with John Emerson; a visual designer whose interests revolve around social activism. The piece is

6. Paglen, Trevor, **Bio**, http://www.paglen.com/pages/bio.htm (accessed March 4, 2008)

7. Emerson, John, **Mapping the War on Terror**, http://backspace.com/notes/2006/09/17/x.html (accessed March 4, 2008)

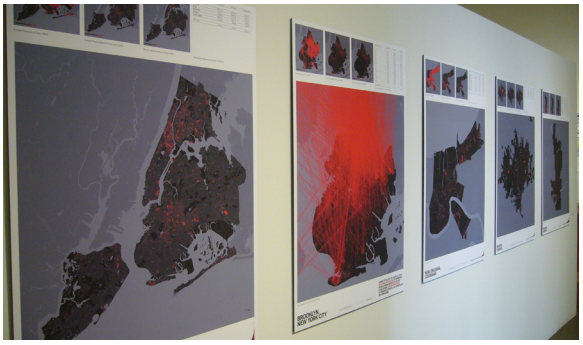
8. Spatial Information Design Lab, **Million Dollar Blocks**, Columbia University, http://www.spatialinformationdesignlab.org/projects.php?id=16 (accessed on March 4, 2008)

9. **International Networks Archive**, Princeton University, http://www.princeton.edu/~ina/ (accessed on March 4, 2008)

10. Peretti, Jonah et al, **Fundrace: Campaign Donors 2008**, Eyebeam and Huffington Post, http://fundrace.huffingtonpost.com (accessed on March 4, 2008)

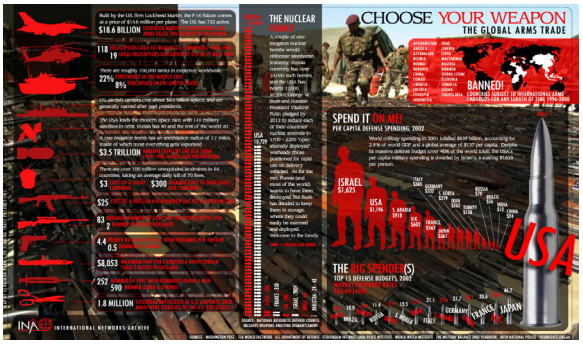
a map displaying the routes used by CIA aircraft during extraordinary renditions of prisoners. The practice of extraordinary rendition involves abducting a suspect and transporting them to a country where interrogation laws are not as stringent as in most western countries. The piece uses classic cartographic techniques to display these travel routes and highlight the highly trafficked destinations.

The map was produced into a billboard that was located along Wilshire Boulevard between Beverly Hills and West Hollywood.[7] This is a good example of a successful combination of visual technique and dissemination strategy. It falls short of detailing the number of flights to locations, or outlining the timeline of occurrence, but similar to Lombardi's work it maintains a minimalist aesthetic to communicate a specific message about inter-relationships.

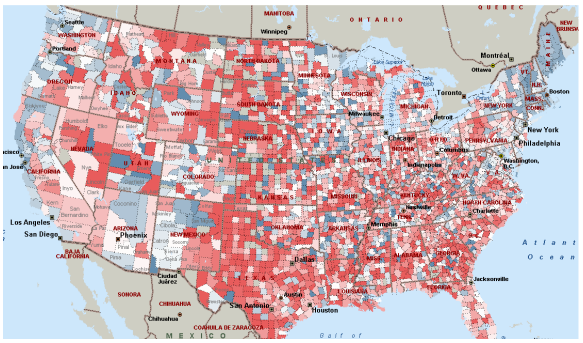


2.1.4 Other Projects

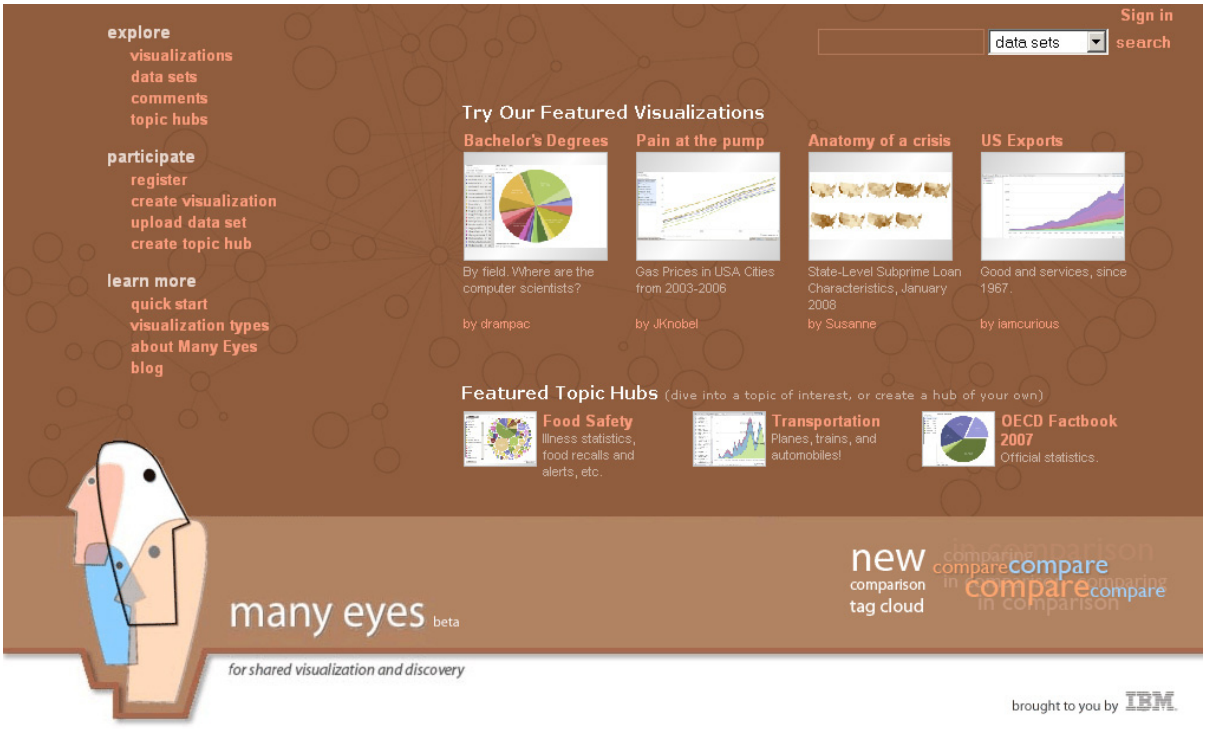
Million Dollar Blocks by the Spatial Information Design Lab at Columbia University: A visual analysis of government spending on incarceration by prisoner home address.[8]



International Networks Archive at Princeton University: Data, information graphics, and interactive maps related to world issues.[9]



FundRace: Plotting data on every campaign contribution to the current election.[10]



Many Eyes, front page, by IBM AlphaWorks.

2.2 Within the Sciences

2.2.1 Many Eyes

Many Eyes is a community created by IBM's AlphaWorks division revolving around the shared development of visualization tools and the distribution of data sets. The visualization applets created in Java are embeddable on web sites and can be utilized with any data set available and appropriate. The variety of visualization types insures the availability of a method for envisioning quantifiable data no matter the goal for analysis.

This is an important experiment in providing tools for visual communication to the general public. Giving someone the capability to communicate data visually is comparable to giving them the ability to communicate their ideas through the written word. The question remains; will people choose to interact in the community, and how will they take advantage of it? At the time I am writing this, 9,603 visualizations have been created[11], and 14,526 data sets have been uploaded[12], all to be openly shared.

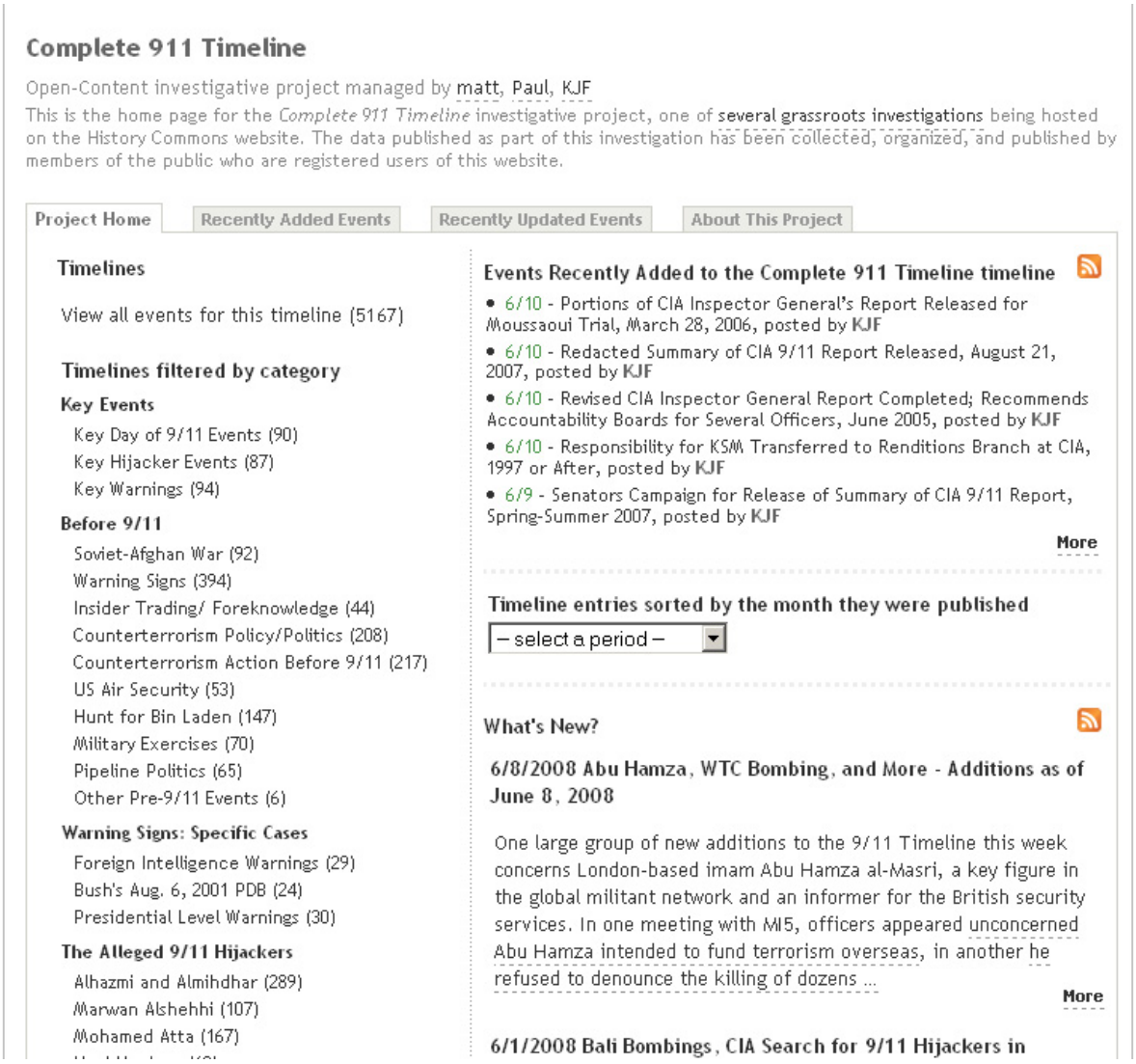
The site provides additional community aspects such as the ability

11. Many Eyes, **Browsing Visualizations**, http://services.alphaworks.ibm.com/manyeyes/browse/visualizations (accessed on March 4, 2008)

12. Many Eyes, **Browsing Data Sets**, http://services.alphaworks.ibm.com/manyeyes/browse/data (accessed on March 4, 2008)

to comment on other user's visualizations and data sets. This allows the community to be an open forum with a critical stance towards retaining a higher level of quality in each others work, as well as in educating each other on better methods for performing a task. A key lesson to be learned from Many Eyes is its ability to embed participatory practices within the creative process. The community created through this participation is necessary for both disseminating information as well as getting feedback about its presentation.

Cooperative Research History Commons, Complete 9/11 Timeline, by the Center for Grassroots Oversight.



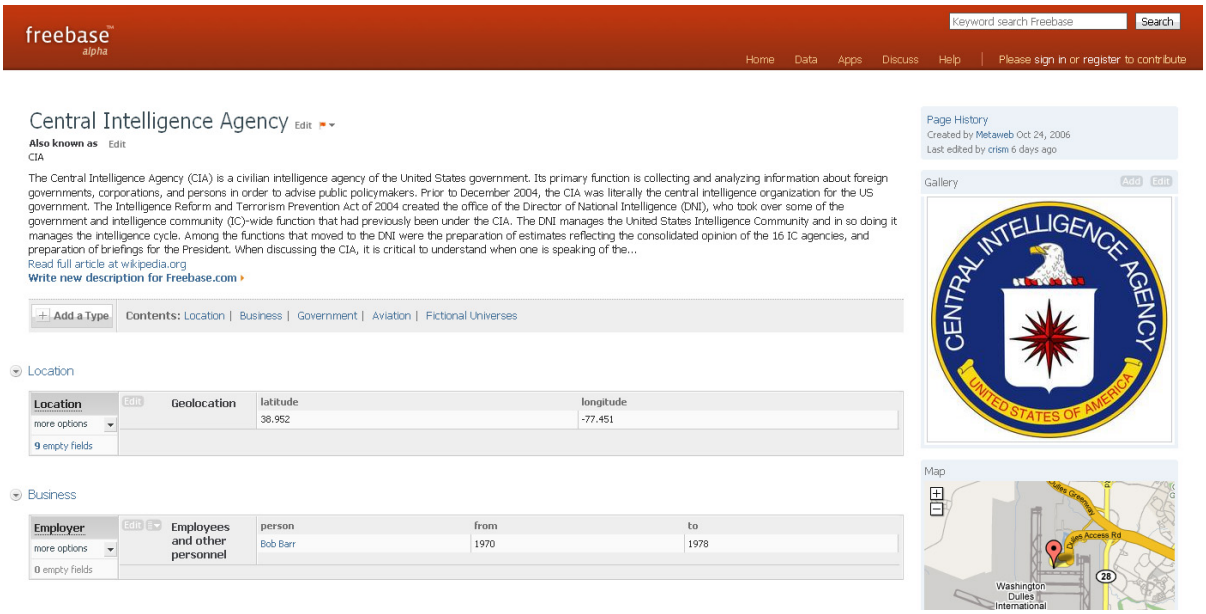
2.2.2 Cooperative Research History Commons

The Cooperative Research History Commons is an experiment put forth by the Center for Grassroots Oversight to create a common center for collaborative investigation of the government and private sector. It works through independent researchers inputting data about events and correlating these events with greater timelines illustrating a narrative. The site becomes a community as the work of researchers builds off of others.

The subject matter of many timelines involves topics that are often glossed over or simply aren't covered in the mainstream media, and require further investigation on the individual's behalf to find information.

The project is quite successful in developing many in depth narratives through linear timelines simply by referencing outside sources. No doubt the most active project on the site is the Complete 9/11 Timeline, in which users have contributed 4,412 events, each with a reference to a published source (often times several), relating to the events leading up to and occurring on September 11th, 2001. Each event is tagged with key-phrases which can be combined to allow the user to view by their subject matter. In addition, each timeline created can run parallel to each other, and can cross paths through shared events.

History Commons has the right idea of arranging everything along a timeline, since it is the one continuous dimension that we can measure all events on, and power structures are created through the events of the characters within them. However, linearly is not always the most effective way to illustrate the interconnecting power relationships between characters. Lombardi worked in both realms, introducing timelines into some of his work to emphasizing the events involved in the collapse of a particular organization. However most of his Narrative Structures used a non-linear network technique to emphasize the relationship network during a particular duration of time.



2.2.3 *Freebase*

Freebase, article on the Central Intelligence Agency, by Metaweb Technologies.

13. Metaweb Technologies, **Freebase**, http://www.freebase.com (accessed on March 4, 2008)

Freebase is a unique service created by a young company named Metaweb Technologies, which aims to create an "open, shared database of the world's knowledge."[13] This may sound like it's already been achieved by Wikipedia, and a great deal of it has. However, there is one main dissimilarity which makes a world of difference – data modeling.

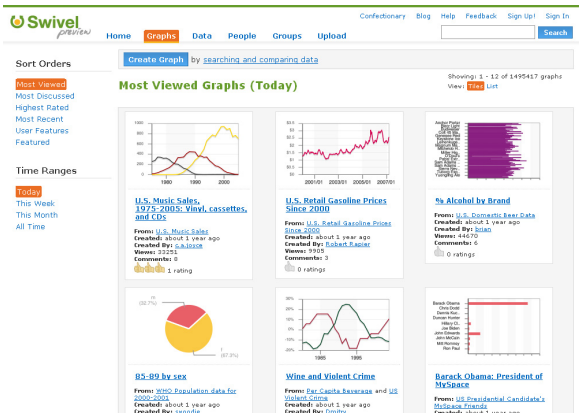
Wikipedia works like a web site with articles comprised of text, containing images, and linking to other articles. People continually make revisions to the articles and change their relationships with other articles. Of course, all of this works off of a complex and efficient database, but does not take full advantage of the information.

Freebase uses data modeling, which is the act of breaking down a particular piece of information into its component properties and its relationships to other bits of information. These bits of information can have multiple data models applied to them to include different properties. For example, Arnold Schwarzenegger is both a governor and an actor, in which case he would have both data models applied to him. In addition he was a professional bodybuilder, so he could have that data model applied to him as well. To keep the project alive and evolving, new data types can be created by users to fit any sort of information they wish to model. What makes all of this segmentation of properties important is its ability to create specific and unique

searches based on combinations of models and properties. With a fast, efficient system, the possibilities for quantitative analysis are at this stage still beyond conception.

Not only has Freebase been constructed as sort of online encyclopedia, it also contains an application programming interface (API) which allows developers to make direct requests to the database in a neatly structured fashion. This allows for the development of 3rd party applications that utilize the combinatorial assets of the Freebase system.

2.2.4 Other Projects

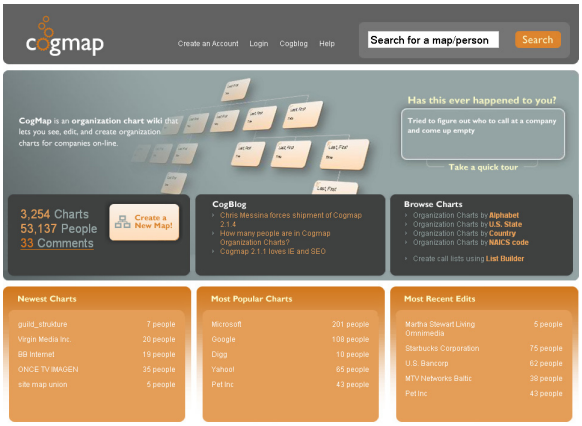


Swivel: A shared data repository and open graphing tools. Very similar in functionality to Many Eyes, it tends to focus more on the archiving of publically accessable data while providing people the ability to visualize what they have entered into the system.[14]

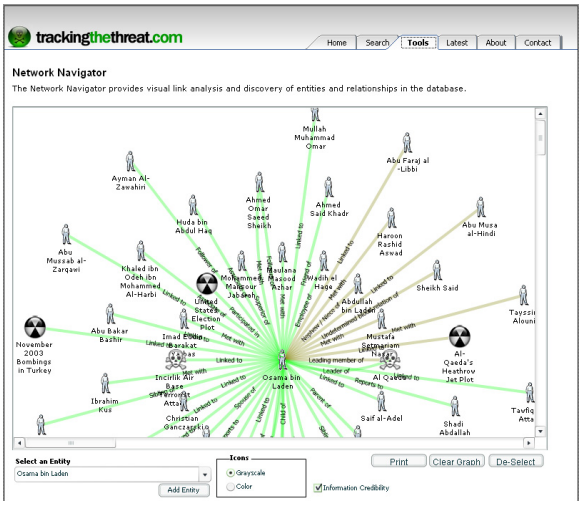
MAPLight: Combining data about campaign contributions and the voting record of the legislators whom receive them. The site is designed to provide people a resource for seeing how the actions of lobbyists influence the decisions made by politicians.[15]

14. Swivel, **Swivel - Tasty Data Goodies**, http://www.swivel.com (accessed on March 4, 2008)

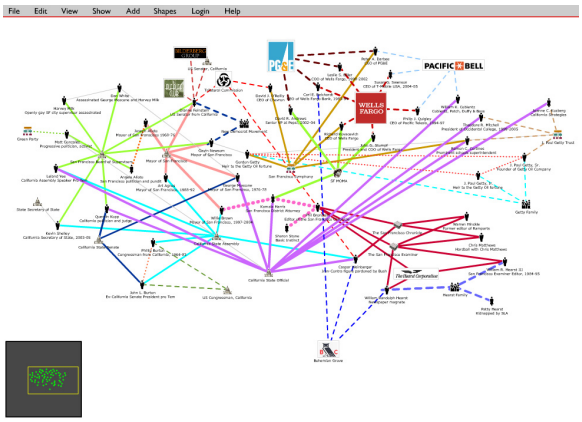
15. MAPlight, **MAPlight - Money and Politics: Illuminating the Connection**, http://www.maplight.org (accessed on March 4, 2008)



CogMap: A visual wiki for organizing hierarchical charts of organizations. The site tracks the executive structure of companies, allowing users to input their bosses and visualize hierarchies based upon the corporate control within their workplace.[16]



Tracking The Threat: Mapping relationships within the Al Qaeda network.[17] The site uses a very similar verb-subject-object-object (VSOO) structure to the Power Structures project, in order to form simple relationships between elements in the system.



NNDB Mapper: Visually mapping data collected by an intelligence aggregator.[18] The mapping utility is based on data mined from news reports, and the visual language used is purely up to the author of the map to decide upon, which can prove to be beneficial when the user knows what they're doing, and detremental when they do not.

16. CogMap, **Cogmap: The Org Chart Wiki**, http://www.cogmap.com (accessed on March 4, 2008)

17. Tracking the Threat, **Network Navigator**, http://www.trackingthethreat.com/flash/nav.jsp (accessed on June 11, 2008)

18. NNDB, **NNDB Mapper**, http://mapper.nndb.com (accessed on May 29, 2008)

3 Power Structures

Power Structures allows for the communal management of data and visual mapping of networks of influence. Participants are invited to contribute data online about people, places, things, events, groups, and the relationships that tie them together. The maps that are produced act as narratives with the purpose of revealing new information or clarifying already known information about the power structures that influence our lives.

3.1 Goals

There are certain fundamental obstacles that an individual must overcome during the investigation of a complex system. These are the processing, analysis, and distribution of information. These three things must work together to transform information into knowledge.

3.1.1 Communal Data Management

Handling data can be a complicated problem. Data doesn't just exist; it's extracted from bits of information. Data is delineated from information in that it focuses on the lowest level properties of information, stripped from formatting and non-essential elements. The issue of data modeling is how to efficiently and thoroughly retrieve the properties comprising the information. Once it becomes data, we risk losing the connection to its original context, which is why it becomes important to include references. Loss of context impacts our knowledge about a piece of data, which is determined by our understanding and perception of the subject.

There is also always the question of empirical accuracy. To what degree is the source of information correct? What prevents someone from tainting data with poor sources of information? This is where the system becomes reliant on a self-moderating community where, in theory, for each act of defacement made to data, there is someone to revise and correct it. Wikipedia has come to depend on this and has been, for the most part, successful.

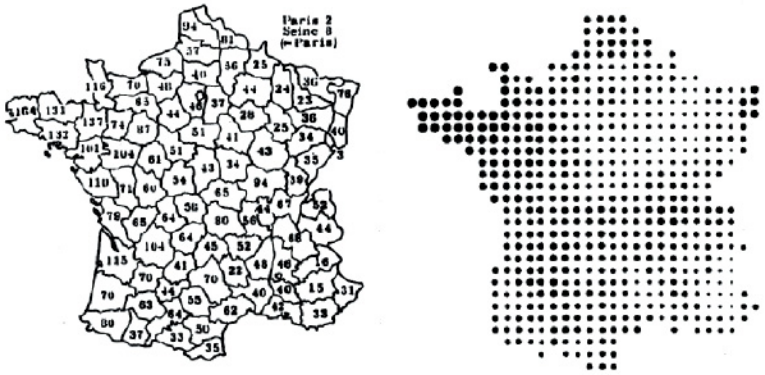
Along with the quality and accuracy of data, there is the relevance of its inclusion in the system as well. The purpose of the platform is the illustration of power structures, but it's flexible enough to map any narrative. Maintaining a focus on power structures requires some form of map or user moderation.

3.1.2 The Visual Language of Power

Creating a visual language that works both on a finite as well as holistic level requires the use of analytical design tactics founded by Jacques Bertin in his pivotal work *The Semiology of Graphics* (1983), and further analyzed and improved upon by the work of Edward Tufte. Bertin was interested in the psychology of vision and what attributes of form can be used as pre-attentive retinal variables.

These pre-attentive variables are temporal properties which cause our visual cortex to take immediate notice of their variation, before we actively attempt to understand the imagery. Bertin recognized that size, value, texture, color, orientation, and shape can all be used as pre-attentive variables. Each of these properties has their strengths and weaknesses in terms of representing underlying types of information. When implemented appropriately, they can be used to create a gestalt psychological effect that Tufte refers to as micro/macro reading[19], which utilizes the individual implementations of pre-attentive variables to create a holistic view of the entire scene which is more than simply a sum of its parts.

19. Tufte, Edward. **Envisioning Information** (Cheshire: Graphics Press, 1990), p. 37.



This example from Bertin's **Semiology of Graphics** (1983) displays two maps conveying the same data relating to geographic locations in France. The image on the left uses numbers to explicitely state the value of the information, while the image on the right uses relatively sized circles. The image on the left requires time, memory, and active investigation of the image to determine the values of the numbers and analyze their collective meaningfulness. The image on the right provides the viewer with an immediate holistic impression of the data set. This principle relies on the visual cortex to initially analyze the data and provide the viewer with a first impression.

The visual representation of power requires investigation into the forms power takes on. This is a sociological question requiring the analysis of social network structures. One can attempt to define a taxonomic hierarchy of social network relationship types if we can conclude that there is a fixed amount of general families of relationships, such as political, social, occupational, etc. Within these broad families can be sub-categories creating a nested hierarchy from generic to specific.

If this is not the case, then a folksonomic approach may be preferred in order to establish a community's viewpoint and allow future

growth as new relationship types are formed. Folksonomy uses a weighted analysis of contributions from individuals to create a communally derived set of items. This becomes problematic in terms of maintaining a visual language of relationship types when someone is needed to moderate the design of each new addition.

Developing a visual language around social networks can quickly turn into a large catalog of visual indicators based on size, shape, placement, color, and pattern. The catalog can become so large and diverse that utilizing it in the greater context of making maps can result in the loss of the pre-attentive variables it was trying to achieve.

Lombardi utilized a minimalist approach to this issue, defining a short list of visual indicators communicating various attributes of relationships. This short list also left a great amount of ambiguity and abstraction in Lombardi's work, often leaving the viewer contemplating the real nature of the relationships.

All of Lombardi's work began with simple graphite using only arrows, line stippling, zig zags, and curly lines as indicators of different relationship types. As he revised his maps and matured his aesthetic approach he began to integrate the color red into the more important aspects of the maps. He would indicate indictments with this color as important, concrete events in the narrative structures he was outlining, so they should demand more visual attention from the viewer.

3.1.3 Information Dissemination

As the project is ultimately being used to uncover illicit connections between power brokers, it is inherently an activist endeavor, and part of the process is to distribute the results in order to inform others. With this in mind certain additions were made to the project to help enable distribution.

Lombardi's work was only seen in galleries, and didn't behave like products of activism, although their creation was rooted in investigative research. Since Power Structures is constructed as an online platform, it's only natural that its primary means of product distribution is via the web.

The first method of distribution is a direct link to the Power Structures web site with a unique identifier for a particular map, which is then loaded automatically. This allows the viewer to immediately navigate the map interactively and possibly even

contribute further to it.

The second method of online distribution is using the embeddable viewer. This small flash player is used to embed interactive maps directly into blogs, forums, and any other web sites using any size and aspect ratio. This is designed to accompany other attributes related to the underlying research and act as a visual aid in communicating the information. It is restricted in its capabilities, allowing only the browsing of the map it was intended for.

The third method of distribution is print media. Since all of the maps are comprised of vector data, they can easily be printed at any scale and any resolution. These prints can serve a purpose to the creator, or creators, in that they can easily be drawn and annotated on to aid in the creation of future revisions. They can also be distributed and displayed as posters. I print versions which I then slip into the library books I used as resources in creating the maps in the hope that the next person to check those books out can use the maps as artifacts in their own research.

3.2 Operations

3.2.1 Data Addition and Management

The project breaks the data addition process down into steps. As one is conducting their research they will come across sources of information which they will then utilize as the underlying resources for their map. In doing so they begin to analyze these resources for the components they're comprised of. These components take the form of elements and the relationships which connect them. These three layers of data are integral to the functionality of the system.

The initial step to take once someone has found a source of information is to add that resource as a citation. This is required as the basis for the relationships soon to come. The next step is to add the basic elements from that resource in order to establish nodes in the map. These elements take the form of people, places, things, groups, and events. This basic delineation between element types allows for distinct data modeling and separate attributes.

Any elements that are added can be edited by other users. In this way the information is communally moderated to help ensure accuracy and prevent defacement. Elements can also be reverted to previous revisions, and their history can be tracked across users to track malicious behavior.

3.2.2 Relationship Construction

Relationship construction is the third step in data entry, and works as a distillation process to refine the relationships between elements down to their most basic form. Having already added a citation and a number of elements from that resource, one can then see that there are distinct relationships between the elements. These relationships have directionality, familial properties, and descriptive attributes. Analyzing each relationship for these properties allows the user to construct an appropriate relationship within the system.

As each relationship is added, it references a particular citation already added to the system. In this manner, maps begin to form as pointers towards a bibliography of information resources. The strength of the maps accuracy relies on the strength of the underlying citations. Using primary resources naturally strengthens the legitimacy of the data, but the validity of the underlying information is left up to a subjective analysis by the maps author and the other users moderating the system.

Simple relationships are the basis for particular narrative constructions between elements. Two elements can contain multiple relationships between them of different types, allowing for the creation of structures designed to communicate varying narratives.

3.2.3 Mapping and Metrics

Mapping social networks, especially selectively constructed narratives within them, is a matter of both quantitative as well as qualitative analysis. Automated spatial mapping based on quantitative metrics within the network has been a study within graph theory for many years. Many of these applications result in ball-and-stick diagrams, applying metrics such as closeness, structural cohesion, and eigenvector centrality to analyze the importance of nodes within the network. While these definitely provide valuable data about the network in an automated way, they lack the ability to understand the qualities of the relationships involved and create an intentional narrative.

Rather than automate the mapping process, the goal of the Power Structures software is to augment the user's ability to create maps. Instead of doing things for the user it enables the user to do more. Automating a crawl through the database would create maps with mixed narratives, which, although interesting and still based on the low level relationships already established, does not have the capability to focus on telling a particular story.

Narrative construction relies foremost on user control and understanding of the subject matter they're mapping. The spatial organization of the map is a reflection of the authors understanding, and may be based on attributes that can not be measured. After a narrative has been created and mapped, various automated processes can be used to help facilitate certain display types and attempt to reveal quantitative information.

3.2.4 Lombardi Clouds

The aesthetic evolution of Mark Lombardi's work led him to create his narrative structures using geometrically congruent arcs. This technique was initially adopted for the Power Structures software purely as a formal attribute to make the graphs attractive, but after mapping while under the influence of these curves, I found there are a great deal of expressive qualities provided by the arcs, making them far more useful than originally anticipated.

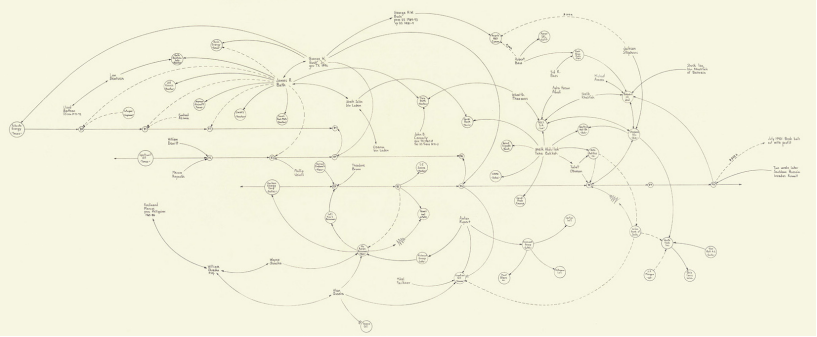
I have begun referring to the structural compositions created from multiple geometrically congruent arcs as Lombardi Clouds, as many of his narrative structures ended up looking very cloud like in appearance. These clouds utilize the arcing action of the curves to direct the viewer through the map. Utilizing the directionality and size of the arcs, as well as their continuity through nodes, can emphasize sub-plots in the greater narrative.

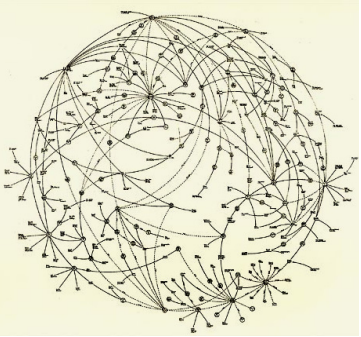
Constructing these visually interesting continuous curves is partially automated and partially user controlled. Each curve between two elements is an arc of a circle, each one having the same radius. The user has the choice of selecting a default radius for all of the curves to be drawn from. More importantly, the user is also left the task of determining how to place elements spatially, as well as directionality of the curves and whether they are minor or major arcs. These are important attributes in constructing not only something visually appealing but visually functional.

In order to assist the user's task of mapping, a circular grid was implemented which can be used to aid cloud formation. Instances of the grid can be layered and staggered on top of each other to help the map maker determine where the intersections of sub-plots will occur. This also allows the easy creation of continuous curves by placing elements in a linear relationship system along an arc congruent to that being drawn by the relationship curves.

In addition to cloud-like structures, Lombardi on occasion made very

circular narratives where the radius of the arcs was large enough that the entire structure could be encapsulated inside one continuous curve. This was also implemented on a smaller scale within his clouds.





left:
George W. Bush, Harken Energy, and Jackson Stephens, ca. 1979-90 (5th Version) 1999, 24 1/8 x 48 1/4 in. by Mark Lombardi An example of a cloud-like structure using arcs created from geometricall concentric curves.

right:
Oliver North, Lake Resources of Panama, and the Iran-Contra Operation, ca. 1984-86 (4th Version) 1999, 63 x 82 7/8 in. An example of a circular structure with most of the relationships placed in the interior.

3.3 Gallery Installation

The Power Structures project was initially going to be framed within the context of artifacts acquired from an independent investigators work space. A workstation would be reassembled in the gallery space with a desk, computer, and books related to the subject being researched. On one side of the desk would be a corkboard filled with photos, maps, documents, and article clippings, all interconnected with red thread. On the other side, prints of maps created using the Power Structures platform, all illustrating the same narrative in different organizational manners. This idea was eventually scrapped as it felt too distracting to the actual product of the project, which is the software platform.

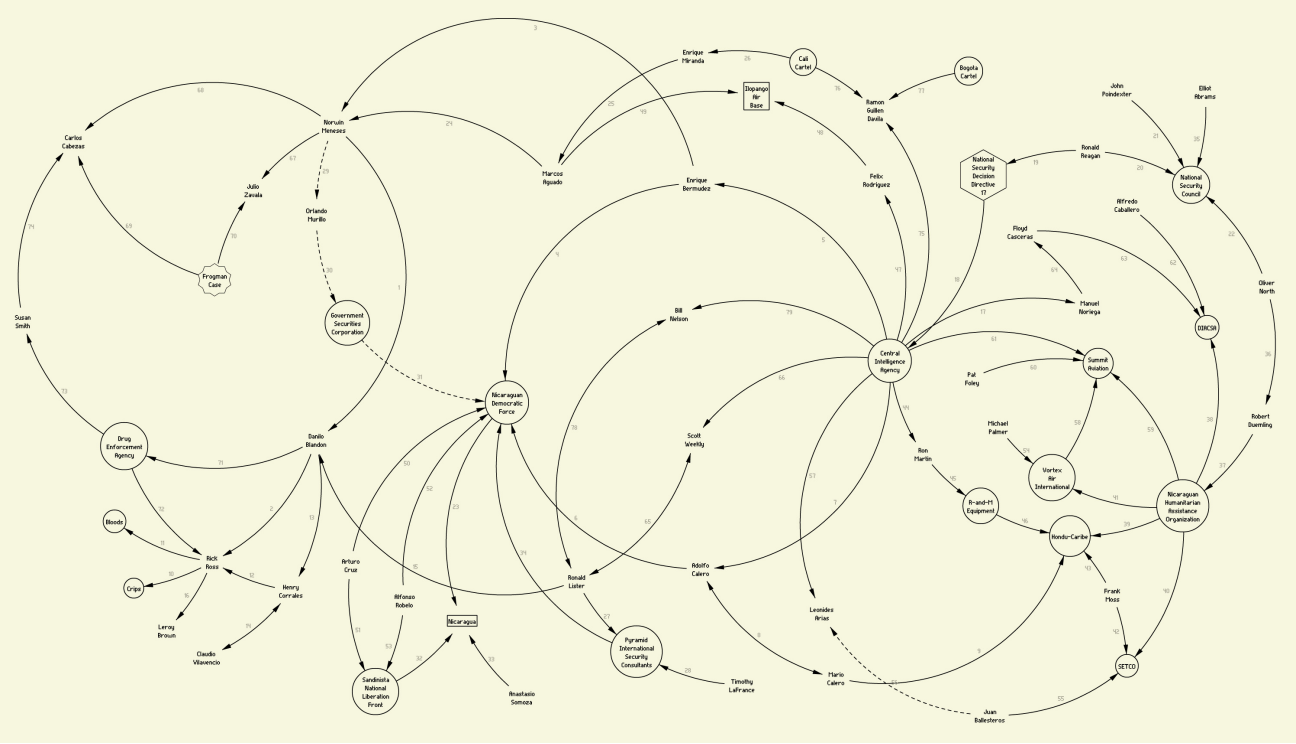
The revised installation contained three workstations, each mapping a different narrative. Each workstation contained twelve prints of revisions of their respective narratives hanging above the computer monitor. The prints are mounted using small magnets so that they can be shifted around and replaced easily by future revisions.

It felt necessary to emphasize Power Structures as a software product and not merely the prints created from it. With this in mind I sat at a workstation during the exhibition and demonstrated the use of the system. Over the course of four hours I created twelve revisions of the Blackwater Worldwide narrative based on information about their executives, relationships to government institutions, and news articles about their recent activities.

A view of the installation in The New Wight Gallery at The Broad Art Center at the University of California, Los Angeles, May 27th, 2008.

The project was not designed to be seen or used within the gallery context, so creating an installation for it should be reflective of the way it is used. Reducing it down to basic workstations with no additional garnish allows the patron to get a clearer understanding of what the project actually is.

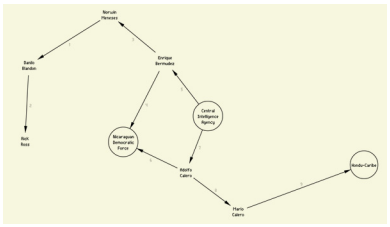
4 Example Maps



4.1 CIA, Contras, Crack

This narrative is based on allegations of CIA complicity in the international drug trade, specifically in relation to the clandestine financing of the contra guerillas in Nicaragua. This topic was chosen for a number of reasons. It has been heavily documented, including several investigations, senate hearings, testimonies, newspaper articles, and books. It has a strong connection to the underprivileged communities of Los Angeles, who fell pray to the short end of the financial chain. It's also an excellent example of how our greater foreign policy, and the clandestine organizations putting it in motion, has a direct impact on our local environment.

Revision Process



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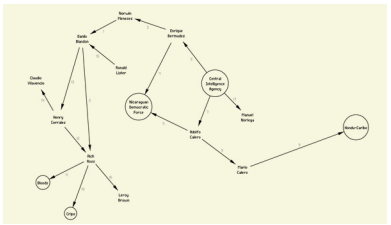

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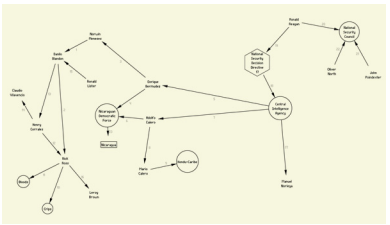

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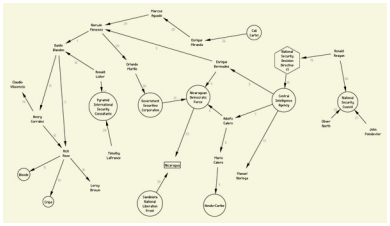

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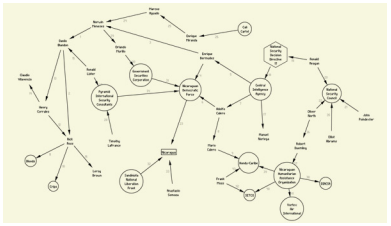

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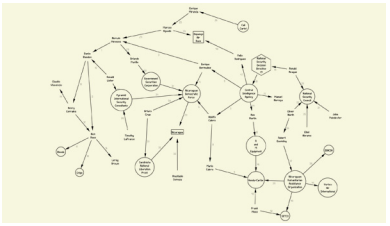

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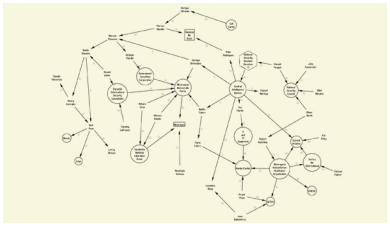

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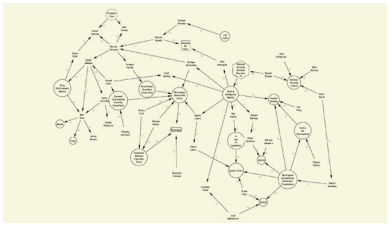

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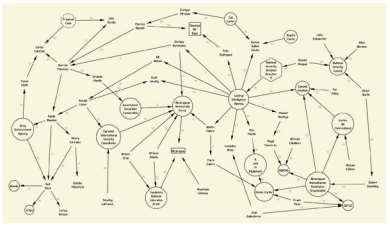

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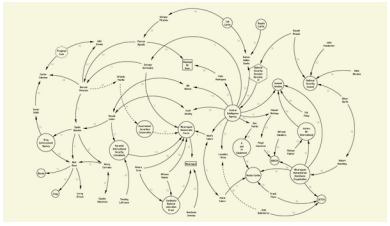

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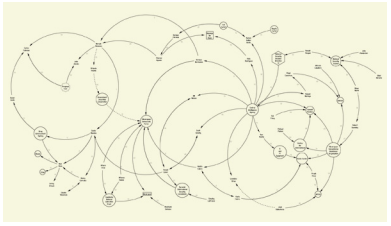

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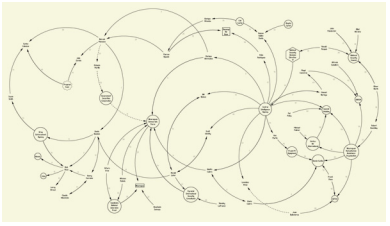

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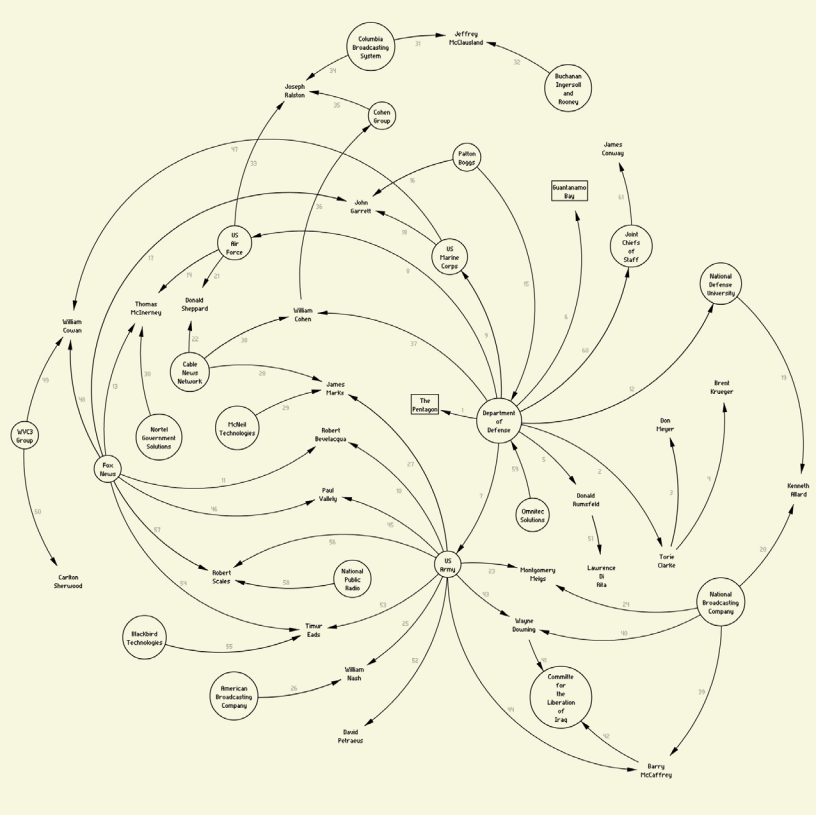
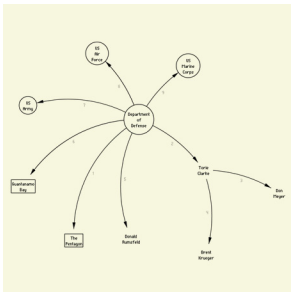


4.2 Message Force Multipliers

This narrative was an exploration in deriving a map from a single source. This source was an in depth investigation performed by the New York Times into a Department of Defense propaganda program using ex-military officials turned media military analysts.[20] In reality the structure of the system behind this was much more complex than the resulting map, however the map is comprised of elements and relationships solely from the New York Times article. Pursuing a more in depth investigation including analyzing their primary sources (a wealth of e-mails and documents from the DoD obtained through a law suit), as well as articles following the aftermath of the publishing of the investigation.

20. Barstow, David. **Behind TV Analysts, Pentagon's Hidden Hand**. *New York Times*, April 20, 2008, front page. http://www.nytimes.com/2008/04/20/washington/20generals.html (accessed on June 11, 2008)

Revision Process



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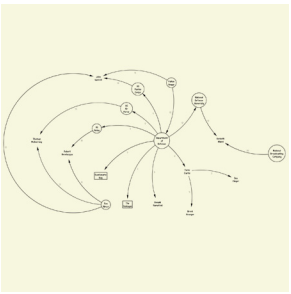

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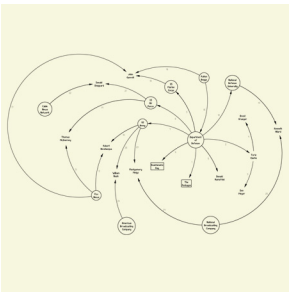

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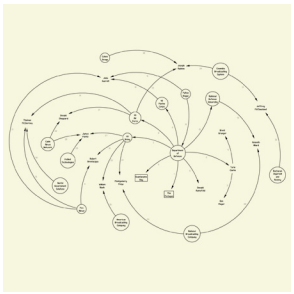

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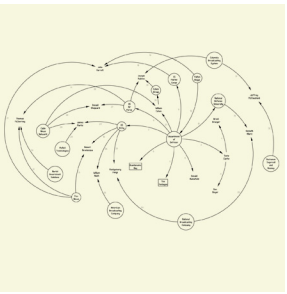

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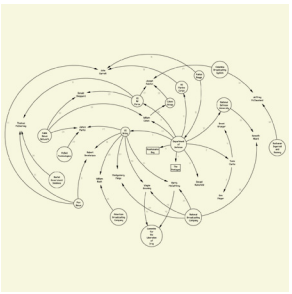

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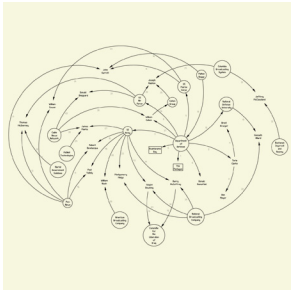

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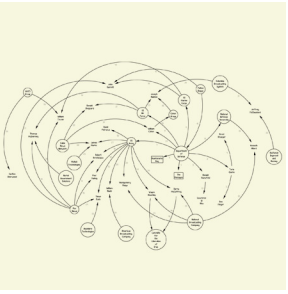

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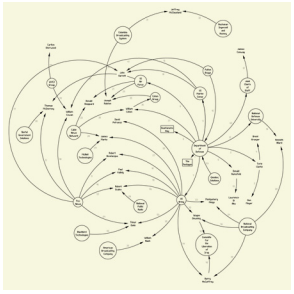

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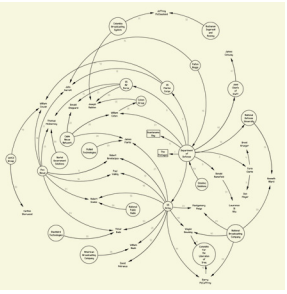

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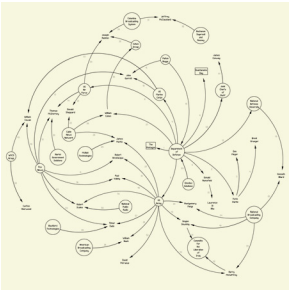

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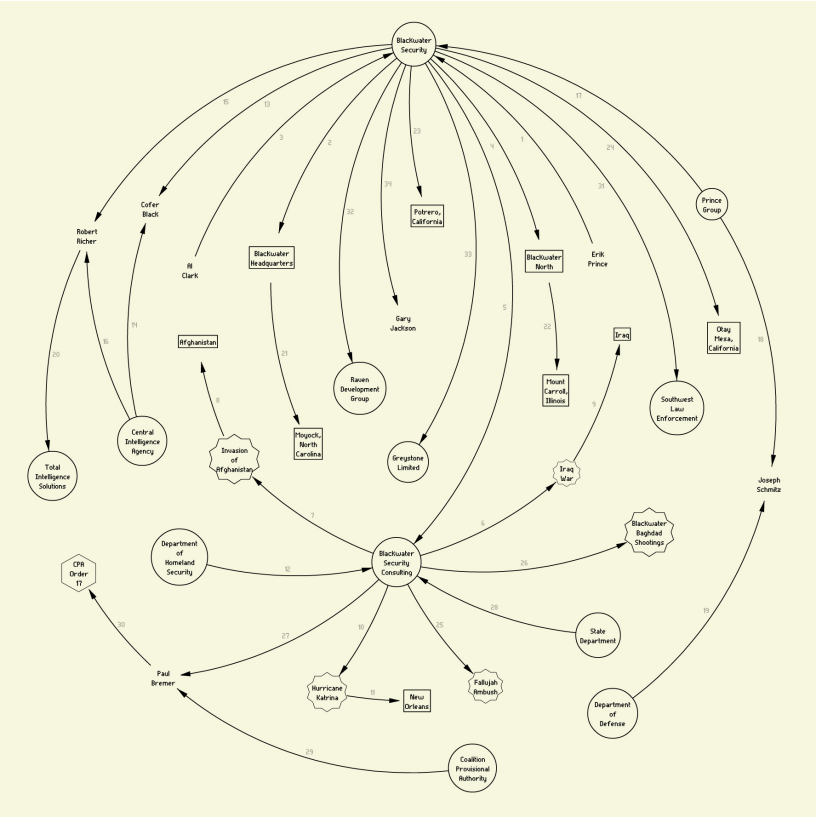
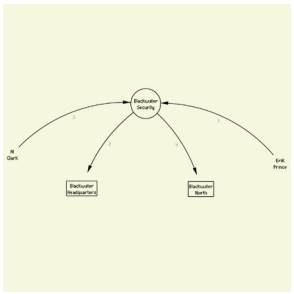


4.3 Blackwater Worldwide

This map was a quick exploration into the relationships Blackwater Worldwide has to its executives, branches of the government, and the locations and events they're associated with. The narrative leaves a great amount of room for growth in that the relationships are rather shallow and can be explored to a much higher degree.

Revision Process



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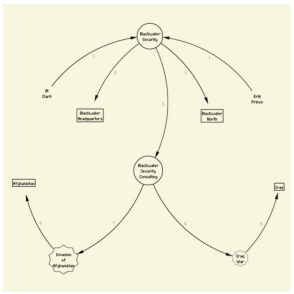

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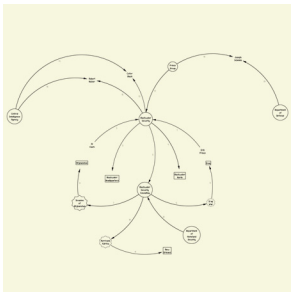

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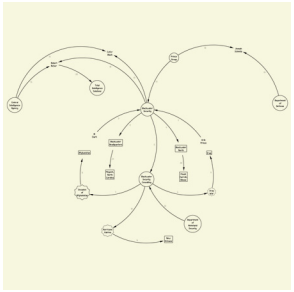

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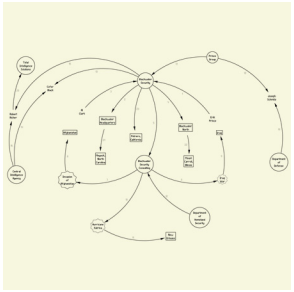

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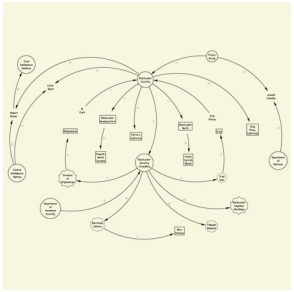

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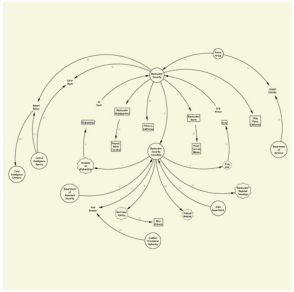

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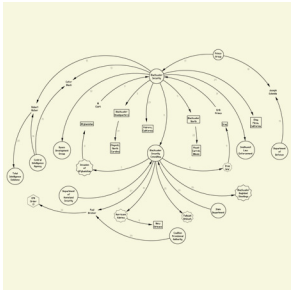

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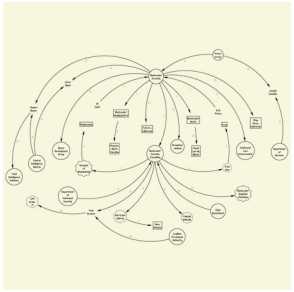

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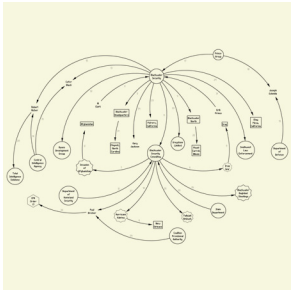

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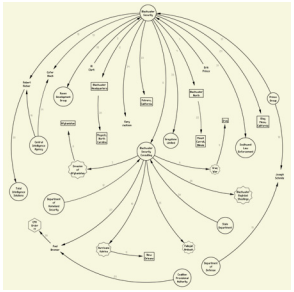

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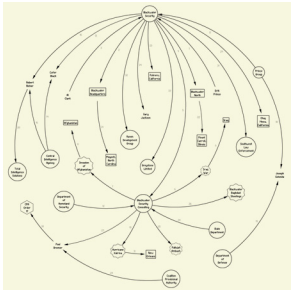

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5 Future Improvements

After spending a year developing the project, I felt it only natural to draw my conclusions from assessing my successes and failures encountered along the way, as well as the possible improvements that can be made in the future.

In terms of the results regarding the visual aesthetic, after implementing the controlled arc drawing algorithm for the relationship curves I began to notice it would influence the way I spatially arranged my elements. This was drastically different from positioning elements connected with straight lines, which had they're own inherent determinacy that I was already culturally associated with. The expressive qualities of the congruent arcs created not only a visually pleasing composition, but also an additional tactic for constructing a narrative. I concluded this was a success by the way it provided the user with a methodology to work within.

Data addition through Flash is still rather clunky, as its implementation of text input forms breaks a lot of basic user interface conventions. A method of defeating this would be to create a system of layered divs containing both independent flash movies as well as regular CSS styled html content. These could then communicate between each other using Javascript, and continue to communicate with the database in the same fashion.

Data modeling is a difficult task to undertake from a single persons vantage point. It's also disadvantageous to have strict data modeling, where a specific data entry has to be a single data type. Systems such as Freebase work to break past these barriers by not only allowing people to communally enter and moderate information, but create their own data types and apply multiple types to particular data entries. This also defeats the purpose of a specific 'relationship' data type, since the relationships are inherent in how the data types overlap. An interface such as Power Structures can be implemented using the Freebase system as a backend, which would not only provide greater flexibility in establishing relationship types but also improve in the ability to implement quantitative analysis on metrics of narrative structures.

Management of data is certainly still an issue, having no practical interface to revert data to a previous state if it is defaced in some manner. A future revision of the software will include a timeline that will allow users to see when data was changed, in what manner, and

by whom. This will become necessary as the amount of contributors grow, the products of the system become more prolific, and the likelihood of defacement increases.

6 Conclusion

Empowering individuals with the ability to oversee the actions of the organizations and institutions which influence and govern their lives provides them with a greater understanding of the systems of control around them. Through understanding the system in which we all exist, we can begin to analyze it for its imbalances. Once we understand the imbalances in place, we can start to make initiatives towards improving the system and creating a more ethically utilitarian ecology.

The Power Structures project was not designed with the intent of changing the way big business and governments operate, but rather enable those citizens interested in investigating the way big business and governments operate and exposing the aspects they feel exploit social justice the most and require the most change. A counter-surveillance scenario against the collection, analysis, and dissemination techniques of large bureaucracies is impossible. The best we can strive for is an inverse-surveillance scenario, in which we all monitor each other and everyone is held accountable for their actions.

I try to remain optimistic for a future in which the abuse, exploitation, and manipulation of the citizenry is no longer commonplace. A future like this will require an information revolution unlike the one we are currently in. This revolution will work to end the abuse of ones information by others, the convolution of information to push forward agendas and public policies, and the obfuscation of information through bureaucratic processes. These tactics of subjugation have helped establish a web of control over the general populace – a web which must be unwoven through activism and community engagement.

> *Oh! What a tangled web we weave*
> *When first we practice to deceive!*
> - Sir Walter Scott

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