UNIVERSITY OF CINCINNATI

Date: May, 11, 2007

I, ____________________________,
hereby submit this work as part of the requirements for the degree of:
______________________________
Master
in:
______________________________
Architecture

It is entitled:
Distributed Networks as Organizational Generator

This work and its defense approved by:

Chair: __________________________
Michael McInturf

______________________________
Aarati Kanekar
Distributed Networks as Organizational Generator

A thesis submitted to the
University of Cincinnati
in partial fulfillment of the
requirements for the degree of
Master of Architecture
in the School of Architecture and Interior Design
May 18, 2007
by
Dawid J. Pol
Bachelor of Science in Architecture 2005
University of Cincinnati

Committee Chairs:
Michael McInturf
Aarati Kanekar
Abstract

We are living in an age of unprecedented complexity, contradictions, global connections, seeming chaos and clash of ideologies. These conditions were propagated by the increased use of distributed networks, which have fundamentally augmented the structure and functioning of our contemporary society. The architectural question that this thesis seeks to revolve is: since architecture is an expression of society, than what principles or methods can be derived from this greater societal shift. Through the analysis of contemporary precedents a series of operations will be deduced and applied through a methodological process of architectural reinterpretation. These reinterpretations will form basis for an architectural solution.

The goal is to develop a mixed use facility using a system of operations based on the analysis of contemporary methods associated with this larger shift in society. This system will establish a connective tissue between the disparate elements of people, program, use, and urban context. Ultimately this system will provide a heightened connectivity between the users, the interior of the building, and the urban condition.
Table of Contents

1) Introduction 1

2) Process 4
   Introduction 5
   Analysis 6
   Conclusion 21
   Glossary 22

3) Site 23

4) Program 25
   Why Mixed Use 26
   Typological Precedent 27
   Program Proposed 28
   Program Use Overlap 33
   Program Requirement Studies 34

5) Research 35
   a) Precedents 36
      Kisho Kurokawa 38
      Bernard Tschumi 41
      Ben Van Berkel 43
      Rowan Wilken 46
   b) Conclusions 47

6) References 53
   Bibliography 54
   Image List/ Credits 55

7) Project Images 57
1 Introduction
Introduction

A shift has occurred in society. This shift includes a movement away from central bureaucracies and vertical hierarchies to a broad network of autonomous social actors. It is part of a larger process of postmodernization that is happening all over the world. Rather than being the locus of activity and innovation, the traditional center has imploded or dissolved, the contemporary landscape lacks a center. Activity has shifted to the boarders, and there has been a shift from objects to relationships between objects. The cause of this shift can be attributed to the emergence of a system of distributed networks which now encompass every facet of our lives, from the economic system to the highways we travel along.

What is a distributed network? The distributed network according to Alexander R. Galloway has no central hubs and no radial nodes, and each entity in the distributed network is autonomous. Rhizomes as described by Deleuze and Guattari are examples of distributed networks. A rhizome is a horizontal meshwork derived from botany. It’s important characteristics are: “it connects point to point via a line, does not begin nor end, always in the middle, operates on variation, expansion, conquest, capture, offshoots, and is acentered and non hierarchical.”

The architectural question that this thesis seeks to revolve is: since architecture is said to be an expression or construct of society, and that there is a shift occurring, which has augmented the structure and functioning of society, than what principles or methods can be derived, to formulate an appropriate architecture which reflects this period?

This thesis will first examine a series of precedents which represent the shift in society according to the groundwork based on Alexander R. Galloway’s research. The precedents analyzed include works by Kisho Kurokawa, Bernard Tschumi, Ben Van Berkel, and Rowan Wilken. It is through the analysis of these writings and works that a series of principles will be formulated. The analysis of these writings and projects can be found in the research section. In that section a series of conclusions are laid out which reveal the contemporary topos, or the underlying principles which can be associated with this time period. These principles than become the basis of a reinterpretative process that examines and analyzes methods of architectural implementation. The process portion of the thesis seeks to find emerging patterns or methods that can be applied as a mode of operation in the development of built architectural form.
Introduction - **Design Goals**

The final outcome will be develop a mixed use facility using the operations developed from the analysis of the concepts derived in the research section. The derived concepts associated with this greater shift and derived from the precedents are multivalence, open endedness and non hierarchy. These operations when applied towards the final product will establish a connective tissue between the disparate elements of people, program, use, and time. Ultimately these operations will provide a heightened connectivity between the users, the interior of the building, and the urban environment. The result will be a highly activated building, a node of activity within downtown Cincinnati.
2 Process
The process portion of this thesis document is based on the formalization of the concepts derived from the research portion. The concepts of non hierarchy, multivalence, open endedness will be explored and analyzed in a variety of architectural reinterpretations. The purpose is to develop a layering of specificity which will inform the final design. As a starting point the original concepts will be conceptualized into three dimensional form and than analyzed. Following this a series of relating constraints will be injected, including site, and program. These conditions and outcomes become the framework or process of layering information which will reveal, affect and morph the original research concepts into a new set of ideas and methods which will be used as a set of principles that can be applied to the design of the final thesis project.

The process is by no means linear as shown in the following section, but it has been grouped according to theme of the investigation. The title and subset of study can be observed in the title of each page.

The process also involves a mixed use program as a constraint. The reasoning for the use of this typology is explored in the section title “Program.” The end product will be a mixed use facility.
This series of diagrams are a transformation of the original concepts of multivalence, non hierarchy, and open endedness. These diagrams show a formal conceptualization of the original concepts. Through this process of three dimensional conceptualization the anticipation is that they will begin to inform a new series of ideas and tangents.

Diagram 1: A technique of using multiple strands which intersect at various points. This point of intersection becomes a place of interaction, an overlap of elements, and possible activity.

Diagram 2: A combination of encapsulating a void through the folding of a strand of material, a mobius strip. The overlap and intersection form a dynamic space from a single operation.

Diagram 3: Similar to diagram 2, but using a folding as a tectonic expression.
The following diagrams although dealing with the original concepts question the idea of connectivity which arose from the previous series of diagrams.

Diagram 4: A connection between 2 points creates a closed loop. Separate elements can be used to create the same diagram as a singular surface.

Diagram 5: This diagram represents a method of using a loop from above as a way of encapsulating or bringing together multiple disparate elements. It also questions the significance of the left over space.

Diagram 6: Similar to the diagram 4, a continuous loop used to achieve a uniform object, allows for a continuity of space between the voids.
The following diagrams deal with the increase of the boundary conditions created by the idea of meshworks (refer to research).

Diagram 7: The compositional and material choices examine the perception of boundary. The object implies a square, but there is a blurring between the edge and the object.

Diagram 8: The layering of the poros material gives an increased spatial depth to this object. It questions the increase of porosity and effect at the boundary.

Diagram 9: The layers within this diagram are wrapped around disparate elements. The boundary condition is similar to diagram 8. It questions whether the porosity between elements can provide a buffer which unifies these elements into a cohesive whole.
The ideas of multivalence, open endedness and non hierarchy are transformed into strategies reflecting these concepts. From the previous exercise loops become an important resultant of the conceptualization of the original concepts. The idea of connectivity, continuity, and layering emerge as conceptual strategies. Formally the most efficient strategy is the use of loops.

The application of the loops with program forms the constraints for the diagrams at the left.

1- A loop (singular) can be interpreted as a continuous entity.
2- Take that Loop and layer in with another loop shift it so that the surfaces intersect. That grouping then becomes non hierarchical.
3- Break the surface into smaller loops. This provides an increased series of intersections.

This grouping because of the intersections becomes multivalent -- A Node.

Loops form an elegant and simple translation of the original concepts.
Loops + Program
In this series of diagrams, loops become the organizational system of the building. Each loop is a programmatic element: residential loop, office loop, retail loop, and entertainment loop. These isolated loops are then overlapped, producing an area of connection. These intersecting areas then become communal spaces, or spaces of activity.

To increase the importance of these intersections or nodes, the programmatic elements, with coinciding use are strategically placed in these areas. This overlap of program, and use activate these loop intersections.

These activated areas are then connected via an external circulation path from within the building to the exterior. This allows for a continuous public zone to weave through the building. This urban loop opens the building to the city connecting it to the context.

The overlap of the functions of the programs, and the circulatory element define a point of activity. These points of activity become highly dynamic because of the relationships established between program, use, time frame, and the circulatory flows of both private and public programs.
Loops + Program
This diagram attempts to formalize the previous diagram of loops with constraints of a site and a more architectural expression.

Each loop: residential (red), office (blue), entertainment (yellow), retail (green) is connected to the ground plane. These loops start at the base and move up and throughout the structure, ending back at the base, forming 4 continuous loops with the site. At the intersection of the 4 loops are nodes. These nodes form points of activity within the structure (see previous diagrams).

A foreign element is then introduced that joins the interior nodes of activity to the public flows of the city (figure 3.2 surface). This foreign element funnels circulation from the ground floor, or the urban level up and through, establishing a connection with the nodes inside. Optimally the goal is that it would become another separate loop, so that there is a continuity and lack of dead end areas within the structure. Deadend areas lead to a reduced flow of circulation, this is the opposite of heightend activity.
Superblock is a maximized program and site extrusion. This forms the extents of the buildable maximum, a benchmark. From this maximized potential a series of formal alterations based on the specific requirements of site, program, and circulation will alter the final design. The proceeding pages examine a process strategic alterations and modifications to a typical mixed-use block. Traditionally the building is separated via layers, a base, which is focused around retail, and the upper floors are typically either office or residential units (refer to program for more details).

The following alterations will change the traditional hierarchy of a mixed-use building.
Superblock + Site

Analysis of the pedestrian flows around the site, both on the ground level and at the skywalk level show an emergent pattern of city circulation through the site.

These strings of circulation can be used as an opportunity to connect the building to the context by allowing these site specific conditions to remain intact. To accommodate these circulation patterns the spaces of circulation are booleaned out of the superblock, creating a series of occupiable spaces.

This process ties the structure with the urban context by tapping into these preexisting lines of circulation. It is important to note that there are emerging patterns of nodes within the site, these points provide a design opportunity for interaction.

Overlap of circulation from street traffic and skywalk circulation form nodes at 4 points within the site. These points can be seen in figure 3.7.
Superblock + Verticality

The traditional mixed use building assumes a stratified hierarchy, which promotes a lack of connectivity of the urban flows with the remainder of the structure. The skywalk begins to hint at a higher level of connectivity but fails to go above the second story.

One way of addressing this disconnect is through a topological transformation of the connections between floor plates. If floor plates are not separate but a continuous surface spanning many levels an inherent connectivity is established. These floor plates can also be connected via more mobile means such as escalators, which than link the top of the structure with the ground level. Escalators maybe more important in establishing this relationship because of their speed and ease of use.

Once circulation is established which forms a continuous flow with the urban context, there needs to be a reason to scale the height of the structure. In this case program must activate the upper portions of the building.
Superblock + Environmental Requirements

The superblock extrusion had no regard for environmental factors such as daylighting and ventilation, this would cause unsuitable working and living conditions. One way to open the superblock is through the use of a boolean operation, so that the core areas are subtracted, allowing light and air into the deep recesses of the block.

Each of the 4 programmatic elements require a series of specific requirements dictated by code (refer to program section).

Another alternative is to understand where the nodes are located from the previous exercise. Once the locations are known, a boolean operation can be carried out on top of those areas. The resultant is a series of visually connected voids within the block as seen in the examples at the left.
Superblock 2

The process of subtraction has led to a block which is roughly half the size of the original superblock. The previous operations have created a site and environmentally specific structure. This process has revealed an emerging pattern from the subtractive process.

There is an inherent formation of looping at a larger scale of the substracted structure. There is also a lack of hierarchical organization, no longer is there a core, but the core becomes disbursed. This dispersal focuses the importance on the paths of circulation from node to node. Movement is along these paths, periodically interrupted by the nodes within the structure. At these points the trajectory along these paths maybe changed. This collision of paths at the nodes shows the strategic importance of these points. These points could be reinforced or injected with more activity is there is an overlap of program, use, and circulation.
Superblock 2 + Loops + Program

The analysis of the previous diagrams shows an increased importance of the node. The following process weaves loops of program around these intersections.

The placement of program is dependent on the specific usage based on time (refer to programming section). The purpose of this overlapping of time, use, and node is an attempt of establishing a mixture of uses and activities at a concentrated point and tied together functionally to generate activity. This energizes the node at various times of the day, funneling the circulatory flows of the city into the structure.

Conclusions from this diagram show the importance of nodes, program, time and use, but express the flaws of using loops of program. Program must be reconsidered in its current organization. Unlike circulation, program is not as flexible, because of this rigidity, program must become an infill element, and cannot be forced into forms or places which are not inherent in their typological structure.
Superblock 2 + Strings

In regard to the previous analysis this exercise focuses on the flaws of program loops and attempts a different system of organization. Loops of program cannot exist due to their rigidity, this includes the inflexibility of sizes and programmatic requirements. The new strategy is to break up the loops of program into shorter strings. These strings are not looping but connect to various nodes. These nodes, since they connect to one another, via circulation, this still allows for continuity.

This function also binds entertainment and retail programs to the circulation because of their flexibility. Residential and office space because of its stricter requirements and rigidity is relegated to infill. In the diagram at the left the yellow represents the more fluid entertainment/retail space/public circulation and the red represents the more rigid office and residential spaces.
Static + Dynamic Loop

Continuing with the conclusions made from the previous example, retail/entertainment are bound to the circulation flows of the urban context, and the residential and office programs are static entities connected to nodal points.

Retail and entertainment are bound to the circulation because it is this loop which draws people in. Binding public program enforces the importance and need for these connections.

This example illustrates the combination of the system on the site. The circulation loop is formed by the site analysis, and the static program is bound to various points along the circulation.
The following diagram is a conceptual model developed as a conclusion to the methods discussed throughout this section.

The focus is on 2 main loops: one loop for the private programmatic elements (residential and office), the second for the public programs (entertainment and retail). At the intersections of these two loops is an increase in program intensity, which is created by the overlap of program with time, use, and circulation. These points become highly activated throughout the day. The private program becomes infill, while the more fluid public loop attaches and acts like a scaffolding in and through the structure.
Conclusion

The greater societal shift caused by distributed networks has brought an increase in the need for continuity, connection, and layering. The continuity of the circulatory flows of the urban context must pass through the site, the building can not impede these forces but must be focused around them. The flow of information, people, economics must be taken advantage of through the layering of program, use, and time in conjunction with these site forces, this process creates nodes of intersection, collisions between these societal forces. These nodes become points of highly activated, overlapping dynamic interaction between these disparate entities. Activity is focused and based around these nodes, activating the interior of the building. Conditions once controlled by the hierarchy of the core and structure are now controlled by the overlapping conditions caused by the flow of people across the nodal points. Connection is established between these interior nodes and the larger contextual nodes of the city. People cross these paths in their daily routines, from home to parking, through the building on the way to work. These places of interchange have become the new public realms of the information age. These connections must be propagated not erased. Connection must also be established visually, so that there is a clear and concise view from one node to another, this way the system of paths becomes an easily relatable object within a field of noise, open to the public not hidden away as in the example of the skywalk. From these nodes, living and work elements can be injected to heighten the process of interchange. The form of this system must be indicative of the societal shift and the connection of people/place/information, spaces of movement become fluid and continuous, surfaces smooth and undulating, funneling the flow of the context within a structure which is permeable and unobstructed. The architecture becomes a product of these forces and flows of contemporary society.
Glossary

An explanation of the most frequently used terms in the process section of this thesis.

Node- a point located at the intersection of circulation paths.

Multivalence- an overlap of activities, program, use, time, people - see Tschumi's juxtaposition.

Non hierarchical- lacking a traditional core and shell.

Open-ended- when something is neither beginning nor ending

Loop- a self-connected element or mobius strip.

Boundary- an area of intensified activity between disparate pieces.

Porosity- the ability to mediate between transparency and rigidity, or translucency.

Layering- overlapping of disparate pieces.

Distribution- lacking a center, or focus.

Superblock- a maximized programmatic site extrusion.

Flow- the movement of people.

String- a segment of a loop which is noncontinuous.

Verticality- the separation of the ground plane and upper portions of a structure.

Static- non-flexible programs, residential and office.

Dynamic- flexible programs, retail and entertainment.

Continuity- the ability to maintain connection.

Connection- the ability of merging disparate elements.
3 Site
Site

Cincinnati, Ohio
5th Ave and Race St.
80,000 ft sq. Block

Overview
Cincinnati can be considered a suburban city. The city is dispersed and spread out. People commute to work via vehicular means. The downtown area because of commuter behavior is relatively devoid of activity after the 6 pm. No activity means a lack of interest in living downtown.

Urban Core
There have been a series of renovations focused on renewing the core, two of these projects include the historic center of the city, Fountain Square and the convention center. There is also a plan to redevelop the riverfront with a variety of mixed-use programs, including residential, commercial and entertainment. These redevelopment efforts have sparked a renewed interest in downtown living, with a reported increase in the core population within the last few years. Unfortunately a problem persists, there is shortage of condominiums and a loose patchwork of amenities. Many more major amenities will be needed to sustain a 24 - 7 population. The area needs an increase in commercial amenities such as food markets, cafes, deli’s and more places of entertainment and leisure.

Skywalk
The skywalk (a network of elevated sidewalks which connect 15 downtown blocks) is currently in disarray. The intersection of the two pieces of the skywalk abruptly end at the proposed site, disconnecting the east side of the city, mainly Fountain Square from the newly renovated convention center. The skywalk is a controversial element with some people believing that it destroys pedestrian street traffic and that it should be torn down. This seems to stem from a larger issue at hand, that the core lacks enough activity to maintain both pedestrian traffic, and even less activity for the skywalk.

The Minneapolis skywalk is an example of a larger and more successful system. The skywalk should be kept as a downtown element, but may need to become more appealing in accessibility/ connection with the street, and a better dispersal of programs within it.

http://www.enquirer.com/editions/2003/06/01/loc_skywalk01.html
4 Program
A mixed-use facility provides ample opportunities of bringing together disparate elements including people, programs, and functions together through the design of a new organizational technique (via previously stated concepts).

**Site Conditions**
A mixed use facility because of the aforementioned site conditions (dead core) needs a combination of residential (condos) with commercial amenities (markets, cafes, etc…), and office space as a way to promote an internal and sustained activity level throughout a 24 hour period.

The addition of entertainment in combination with the commercial amenities will provide an external attractor of activity, thus activating the surrounding urban area.

It is this two fold programmatic idea, that there is a stored potential for activity within the building provided by office and residential spaces. Secondly the entertainment and commercial spaces become attractors for not only internal activity but also for the external urban context.

This hybrid program not only sustains itself but also feeds the surrounding urban condition (and in the process invigorates the urban activity).
Typological Precedents/ Analysis

Analysis of a standard mixed use building.

Typical Mixed-Use Block
The typical mixed-use block is organized in a stratified manner, the first floor is often retail, and the floors above are either offices, or residential units. This type of organization leads to a public interactive zone at the periphery on the first level, but once inside the building's core and upper levels, there is a loss of activity. The core and upper floors devoid of activity lead to a decline of interest in downtown living.

Several methods exist in breaking this hierarchical relationship established by stratification, the residential and retail units can be distributed throughout the building using the meshwork concept, or even providing diagonal connections between floors allowing a public connection to the interior. Breaking the layering system would than begin to allow the flows of the street to access the core and upper levels, offering a simple method of activating the building.
Typological Precedents/ Requirements - Residential

This section documents the normative requirements of the four programmatic elements which will be used in the hybrid mixed use facility.

Typical Rules – Residential
1. Identify repetitive program groups.
2. Total up apartment square footage add 15 percent for corridors and cores.
3. Locate core and stairs, layout apartments around them.
4. Copy floor scheme until desirable height or apartment number is achieved.

General
First floor acts as a transition between dwelling units, and outdoor functions. Often community spaces are located on the first floor, along with mail rooms, and laundry services.

Conforming Parameters
- Layout of Apartments/ Core Choice: Urban condition - Central Double Loaded
- Egress/safety: 200’, 250’ Sprinkled, 20’ dead-end, 2 Means of egress, 6’ Hallway
- Daylight: Building Code B, sqft of unit/33 = min window area
- Communal Areas: Located near lobby
- Mobility: 1 elevator per 75 units

Time Saver Standards
Typological Precedents/ Requirements - Retail

This section documents the normative requirements of the four programmatic elements which will be used in the hybrid mixed use facility.

Typical Rules - Retail
1. Column Spacing; 20, 30, 30 ft to accommodate store frontage.
2. Store Depth; typically 80 ft. Can be smaller by 25 percent if basement or mezzanine is used.
3. Clear Heights; 10 - 14 ft plus mechanical and structure ~ 18 feet
4. Exterior Walls; Service Doors, show windows, public entrance.
5. Pedestrian mall; has a main pedestrian shopping street, connects to the parking, each level should avoid slopes at shopping spaces.
6. Can be enclosed or open, if conditions are favorable for year round open mall.
7. Corridors tend to be 30 ft to 40 ft to avoid barren atmosphere.
8. Use adequate elevators/ escalators or stairs.
9. Visual interconnection btw levels needed, maximum visibility.

General
Neighborhood Center is a row of stores in a strip or line, paralleling the street. Size ranges from 20,000 sq ft to 100,000 sq ft of space; usually contain a supermarket or drug store, a variety of stores, consisting of 6 or more service type stores. Services take place at the rear in an alley space.

Downtown Retail Centers are experimental, close integration of two or more shopping levels, of department stores, shops, restaurants, etc. Should connect directly or by bridges to other shopping facilities, hotels, office buildings, parking garages. Parking is typically multi-decked.

Conforming Parameters
L Spacing of structural grid for maximum flexibility
Store size
Access to service space
Store Front Visibility
Access to main shopping street
Mobility: Elevators, Stair, More the better
Typological Precedents/ Requirements - Office

This section documents the normative requirements of the four programmatic elements which will be used in the hybrid mixed use facility.

Typical Rules – Office
1- Block type structure with central core and radiating access corridors.
2- General office is an open space, allows for light, communication and flexibility.
3- Most private offices are located around the core, space along perimeter for others.
4- Reception area and visitor control required.
5- Employees with close work should be located near the perimeter.
6- 5 types of spaces; office space, file space, special equipment, storage, special rooms.

General
First Floor can act as a transition between exterior and offices, or the reception area at each office becomes the transition point. In a large office complex there can be other program elements such as retail or food services, which tend to be located on the first floor.

Conforming Parameters
Layout/ Core/ Service: Central Core, Maximize Office Space
Egress/safety: 200’, 250’ Sprinkled, 20’ dead-end, 2 Means of egress
500 persons, 8’ Hallway
Daylight: Building Code E, sqft /4 = window area
Mobility: 1 elevator per 35,000 sqft, 1 freight per 230,000 sqft
Typological Precedents/ Requirements - Entertainment

This section documents the normative requirements of the four Programmatic elements which will be used in the hybrid mixed use facility.

Typical Rules - Entertainment
Movie Theatre:
1. Ticket booth near the entry, to attract customers.
2. Control point facilitates access from exterior to interior of theatre/screens.
3. Lounges; places to wait, restroom access, should be in the circulating areas.

Gallery:
Refer to Retail Requirements

Amphitheatre/Outdoor Space:
1. Parking, one car per 3 spectators.
2. Convenient exit/ speedy exit to traffic routes.
3. Convenient to box office and entrance of theatre.
4. Box office located near theatre.
5. Well marked entrance.

General
Movie Theatre: B/C of advent of better home video systems, large theatres are no longer needed, success comes from quality and unusual character. Most strive for small audience 600-1500 with a large picture screen (60 deg screen domination).

Art House Theatre 400 to 900 seats – Foreign Films.

Gallery Space: Flow of visitors is like the flow of water, cases should be aligned to take advantage of the movement. Functions include: Curatorial, Display, Educational and Public, Reception. Reception or lobby space becomes the transitional point of access.

Amphitheater: There are no specific specifications for outdoor theatre. Hearing and good sight lines to every part of performance area req. Sloping Floor, 5 aisles.

Conforming Parameters
Movie Theatre: Access to main shopping street
Store Front Visibility
Spacing of structural grid

Gallery Space: Spacing of structural grid for maximum flexibility
Store Front Visibility
Access to main shopping street

Amphitheater/ Open Space: Access to main shopping street or circulation connected to parking
Away from street side noise.
Program - Proposed

Proposed program: office, commerce, residential, entertainment as a method of achieving a 24 - 7 activity level.

<table>
<thead>
<tr>
<th>Type</th>
<th>Spaces</th>
<th>Residual Loop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential Loop</td>
<td></td>
<td></td>
</tr>
<tr>
<td>anda small</td>
<td></td>
<td></td>
</tr>
<tr>
<td>living/dining</td>
<td>10x12</td>
<td>4</td>
</tr>
<tr>
<td>kitchen</td>
<td>9x12</td>
<td>visual, solar</td>
</tr>
<tr>
<td>personal space</td>
<td>10x10</td>
<td>visual, solar</td>
</tr>
<tr>
<td>bath 1</td>
<td>10x6</td>
<td>visual, solar</td>
</tr>
<tr>
<td>bath 2</td>
<td>10x6</td>
<td>visual, solar</td>
</tr>
<tr>
<td>bedroom 1</td>
<td>10x10</td>
<td>visual, solar</td>
</tr>
<tr>
<td>bedroom 2</td>
<td>10x10</td>
<td>visual, solar</td>
</tr>
<tr>
<td>anda medium</td>
<td></td>
<td></td>
</tr>
<tr>
<td>living/dining</td>
<td>10x12</td>
<td>4</td>
</tr>
<tr>
<td>kitchen</td>
<td>9x12</td>
<td>visual, solar</td>
</tr>
<tr>
<td>personal space</td>
<td>10x10</td>
<td>visual, solar</td>
</tr>
<tr>
<td>bath 1</td>
<td>10x6</td>
<td>visual, solar</td>
</tr>
<tr>
<td>bath 2</td>
<td>10x6</td>
<td>visual, solar</td>
</tr>
<tr>
<td>brandage</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>real storage</td>
<td>300x 4</td>
<td></td>
</tr>
<tr>
<td>Entoutside/ Cultural Community Loop</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Office</td>
<td>300x 6</td>
<td>3</td>
</tr>
<tr>
<td>Collection Storage</td>
<td>22x 20</td>
<td>pr</td>
</tr>
<tr>
<td>Workshop</td>
<td>22x 10</td>
<td>visual, solar</td>
</tr>
<tr>
<td>Kitchen</td>
<td>9x12</td>
<td>visual, solar</td>
</tr>
<tr>
<td>Office</td>
<td>10x10</td>
<td>visual, solar</td>
</tr>
<tr>
<td>Display Room</td>
<td>10x 10</td>
<td>visual, solar</td>
</tr>
<tr>
<td>Laundry/ convenience</td>
<td></td>
<td></td>
</tr>
<tr>
<td>anda small</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Living/ dining</td>
<td>10x12</td>
<td>4</td>
</tr>
<tr>
<td>Kitchen</td>
<td>9x12</td>
<td>visual, solar</td>
</tr>
<tr>
<td>Personal space</td>
<td>10x10</td>
<td>visual, solar</td>
</tr>
<tr>
<td>Bath 1</td>
<td>10x6</td>
<td>visual, solar</td>
</tr>
<tr>
<td>Bath 2</td>
<td>10x6</td>
<td>visual, solar</td>
</tr>
<tr>
<td>brandage</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>real storage</td>
<td>300x 4</td>
<td></td>
</tr>
</tbody>
</table>

32
Program - **Use Overlap**

Intersection of time and function of programs.
Typological Precedents/ Requirements - Studies

Studies of programmatic requirements including day lighting, egress, and safety.
5 Research
a Precedents
The following section will provide background information to help establish the position of architecture in contemporary discourse. It will show primarily through analysis and summery of the ideology and observations of three practicing architects/ theoreticians, and a professor of media and communications that there is a common thread which represents a possible mode of operation within the context of the information age.

This section provides the main idea of the selected persons ideology based on writing. Than an analysis of a work which expresses this ideology in built form.

1- Kisho Kurokawa - The Age of Life
2- Bernard Tschumi - Event Architecture
3- Ben Van Berkel - Liquid Typology
4- Rowan Wilken - Mobilitas Loci
Precedents - Kisho Kurokawa

Kisho Kurokawa is an internationally acclaimed Japanese architect, who founded the Metabolist Movement in the 1960’s, and he has also written extensively on architecture and theory.¹

Kisho Kurokawa in his thesis title “The Philosophy of Symbiosis” explains there has been a paradigm shift from modernism to the “Age of Life.” The “Age of Life” can be summarized by the word symbiosis, which means as acceptance and understanding of the heterogeneities or differences between all.

The Age of the Machine

Kurokawa first describes the ideological principles of modernism, the movement which he is reacting against.

- A time of scientific triumph where natural science, geometry, physics, and physiology prevailed. The sciences “sought to objectify the world, based on the conviction that a single objective truth underlies all reality.”¹

- This scientific or reductive analysis created a dualistic perception of the world; “the part and the whole, the flesh and the spirit, science and art, good and evil, life and death, humanity and nature, intellect and feeling.”²

- The dualistic ideology of the machine age erases “ambiguous existence, vague zone, and multivalent zones are rejected. Contradictory elements, the symbiosis of opposing existence, and mixed states have been treated as chaotic or irrational.”³

On Architecture

Kurokawa then explains the architectural ramifications of modernist ideology on architecture.

- Architecture became similar to the creation of a machine in which parts are assembled to perform a certain function based on “analysis, structuring, and organization to achieve a universal synthesis. The finished products are precisely defined, syntagmatic, in other words, linear connections are the norm.”⁴

- Many of these strategies can be seen in the works of Le Corbusier, and Gropius.

Main Ideas

Modernism can be summed up as: Logo-centric, eur-ocentric, economy, simplicity, precision, purity, multiplicity of function, abstraction, clarity, universality, homogeneity and duality.

The Age of Life

The following describes the main points of Kurokawa’s ideological principles on the “Age of Life.”

- The Age of Life is when “information and information industries are based on the production of distinctions and of meaning.”⁶

- Symbiosis instead of universality which is an acceptance of the heterogeneities between all, where there can be a plurality of meaning and understanding.

On Architecture

Kurokawa offers strategies in the creation of an architecture which is suitable in the Age of Life.

- Condition 1 - Symbiosis

  “Symbiosis is essentially different from harmony, compromise, amalgamation, or eclecticism. Symbiosis is made possible by recognizing reverence for the sacred zone between different cultures, opposing factors, different elements, between the extremes of dualistic opposition. Efforts must be made to achieve extended dialog, mutual exchange, and to discover other positive contributing factors.”⁷

- Condition 2 - Presence of intermediary space.

  “Intermediary space is so important because it allows the two opposing elements of dualism to abide by common rules to reach a common understanding. Intermediary space does not exist as a definite thing. It is extremely tentative and dynamic. The presence of intermediate space makes possible a dynamic, vibrant symbiosis that incorporates opposition.”⁸

Main Ideas

Age of Life can be summed up as the acceptance or unity of the heterogeneities between all, where there can be a plurality of meaning and understanding, architecturally this is achieved through the use of intermediary spaces.

¹-6 web page: http://www.kisho.co.jp/page.php?297
7,8 web page: http://www.kisho.co.jp/page.php?59
Illustation of Kurokawa's ideology can be observed following two examples, the engawa and the Japanese street. He uses these two examples because he believes that the ideas of symbiosis are inherent in traditional Japanese belief system.

**Engawa**

- This space is intermediary because it blurs the distinction between outside/inside, public/private.

- Creates “interpenetration” through the use of a projecting platform and a covered eave.

- The covered space has no specific programmatic value, but is used as an entry, waiting area, and a space for meeting.

- It becomes a space of promoting communication because of the ambiguity between inside/outside, public/private.

- Dynamic because it lacks a prescribed function.
Street
Kurokawa compares the European city to the Japanese city in terms of streets, plazas, and activities, to explain the formation and dynamism of intermediary space.

**European Street**
- Made up of a central hierarchical organization of major plazas, to streets, to smaller plazas, to buildings.
- These plazas would then contain the main functions of civic life for example the main church, or markets.
- Street becomes a place for circulation, lacks multiple functions, is static.

**Japanese Street**
- Lacked plazas so the streets became multifunctional to provide what the plazas provided in European cities; “Not only do streets of eastern cities perform the function of the plaza in the western city, that of binding the life of the private citizen to the life of his city, but... also possesses, at the same time, an ambiguous meaning, for it has double nature: it is simultaneously public and private space, city space and residential space.”

- Is not punctuated by an ending or starting point like a plaza, “it has a multi-valence that responds to a wide variety of places and times.”
- “No assigned spatial function” which contrasts to the eastern city street.
- The Japanese street “at certain times acts as a space for private life and at the other times as a space for public life, the roles of the street of the eastern city are complex and overlapping and profoundly multivalent.”

1,2,3,4 [http://www.kisho.co.jp/page.php/](http://www.kisho.co.jp/page.php/)
Bernard Tschumi’s main mode of thought can be summarized as Event architecture. Tschumi believes we are in a time of “multiple, fragmented, dislocated terrains”\(^1\) where he believes architecture must become the design of conditions.

**On Modernism**

This section will summarize why his work is a reaction against modernist dogma.

- Modern ideology is flawed because form does not follow function; “in today’s world where railways-stations become museums and churches become nightclubs, we must come to terms with the extraordinary interchangeability of form and function, the loss of traditional or canonical cause and effect relationships as sanctified by modernism.”\(^2\)

**Event Architecture**

Tschumi’s ideology on a contemporary architecture.

- Architecture is concept, experience, space and use, structure and superficial image, which should be intermixed into “unprecedented combinations of programs and space.”\(^3\)
- “Cross-programming,” “Trans programming,” “dis programming”: these concepts stand for the displacement and mutual contamination of terms.”\(^4\)
- He states that “the definition of architecture could not be form, or walls, but had to be the combination of heterogeneous and incompatible terms.”\(^5\)

**Main Ideas**

Architecture for Tschumi is this idea of shock, which is composed of a heterogeneous mixture of “space, action, and movement.”\(^6\) He concludes stating that “you maybe able to design the conditions that will make possible for this non hierarchical, nontraditional society to happen….architecture is not about the conditions of design, but about the design of conditions.”\(^7\)

His goal is to take the chaotic interactions of daily life and inject the chaotic interactions into architecture allowing for an intensification of these “rich collisions of events and space.”\(^8\) Event Architecture becomes a mixing chamber for space, action and movement. The result is a highly activated environment.

\(^1\) Tschumi, 127
\(^2\) Tschumi, 125
\(^3\) Tschumi, 126
\(^4\) Tschumi, 128
\(^5\) Tschumi, 130
Illustration of Tschumi’s ideology can be observed in his winning competition entry for Parc de la Villette. The main idea behind the design is the superimposition of 3 ordering systems: the 35 red follies, the sports fields and the circulation paths.

**Parc de la Villette**

-Tschumi points out that his follies “were points of activities, of programs, of events” (127).

- The follies become points of intersection/ or collision of activity.

- The superimposition of the system questions the hierarchical structure and order of traditional architecture.

- There is an ambiguous quality about the follies, due to a lack of program, and the arbitrary design of the forms.

- Derrida commenting on Tschumi’s follies stated that there is “the emergence of a disparate multiplicity.”

---

1 Tschumi, 127
Ben Van Berkel’s approach is primarily focused on the organization of the building, but not in the traditional functional sense but as Berkel states “very much in the idea of how it gives the people an atmosphere to function.”

**On Architecture**

The following summarizes the main points of Ben Van Berkel’s ideology.

- Believes there is a scaling up, but different from architectural to urban scale, a scaling up to accommodate the information network which surrounds us; “This network, which exists to provide us with information by accelerating communication, operates in tightly controlled, yet impalpable space; its structure calculated, but yet unconnected.”

- When dealing with large scale projects Berkel proposes structures which are nonlinear.

- These structures as described by Van Berkel are open-ended multiplicitious formations with connections in many dimensions.

- “The main undertaking of the project is the organization of program, which happens to be largely infrastructural. But it is not the form that has become fluid; it is the intensive intermingling of programme, events, organizational structuring and architectural formation that results in a liquid typology.”

**Main Ideas**

Ben Van Berkel is interested in organizational systems and the creation of scaleless spaces; “this sums up, I think, How structures are changing today; they are losing their specific, separate properties and are defined by more how they relate to the organization of the whole and how you relate to them; you zoom in to solids, you fluctuate along evanescent distances, space opens up around you; any variety of mutations is possible, all unquantifiable, orderless, dimensionless, happening as in a fluidum.”

---

2 Ben van Berkel, monograph issue by El Croquis, 25
3 Ben van Berkel, monograph issue by El Croquis, 27
4 Ben van Berkel, monograph issue by El Croquis, 15
Illustration of Ben Van Berkel’s ideology can be observed in his competition entry for the Yokohama Boat Terminal. The main idea behind the design is the use of a “structural cross,” which creates a new organizational system within the building.

**Yokohama Terminal**

- Structural cross used as a new organizing system.
- Structural cross also used as circulation.
- Allows a “free arrangement” of program.
- Interior space becomes endless and continuous due to the openness of the structure.
- Form appears scaleless.

\[\text{www.unstudio.com}\]
Illustration of Ben Van Berkel’s ideology can also be observed in the Mobius House. The main idea behind the design is the use of a “double locked torus.” This torus coupled with a program arrangement creates a “24 hour living and work cycle.”

**Mobius House**

- The intersections of program and time overlap at communal areas.

- Mobius strip allows for a continuity of space/ circulation/ boundlessness.

- Interplay between solid and void/ concrete and glass further the idea of a continuous strip.
Rowan Wilken’s research questions the affect of new technologies (primarily mobile networking devices) on place. In architecture discourse this becomes an important question, more specifically how has this changed contemporary spaces within the context of the information age? Wilken states that these devices “have changed the way these places are fundamentally understood.”

**Place within the Information Age**

The following summarizes his research and conclusions on the “fundamental” changes on place.

- The cellphone does not negate geography nor distance.
- Mobile networking is highly related to the place and environment we inhabit.
- Wilken than states that this research shows us that networked mobility “prompts renewed consideration of the “where” of everyday places by forcing us to reflect on our apprehension and comprehension of them in transit.”
- In a study of Korean teens he shows us that network mobility creates an increase in face to face contact and does not “diminish the importance of place.”
- From studies Wilken concludes that “place especially local place is central to the practice of understanding of networked mobility, but how place is experienced through networked mobility is quite unique. It is heavily mediated engagement, where place is experienced through complex filtering or imbrication of the actual with virtual.”
- Wilken relates this phenomenon to Marc Auge’s writing’s about non-place, which are “those interstitial zones where we spend an ever increasing proportion of our lives: in supermarkets, airports, hotels, cars…”
- Wilken referring to Norberg-Schulz states that there has been a shift from a notion of “stable place” to the notion of “mobilitas loci: the difference between place as experienced as stable, to multiple places experienced in and through mobility.”

**Main Ideas**

He concludes that network mobility has had an affect on place but rather than “liberate” us from place… these technologies arguably refocus the individual on the fluctuating and fleeting experiences of place/s and their impact on the fabric of everyday life.”

Wilken’s research has shown that within architecture, places of transit or circulation have become more important than before the information age.
b Conclusions
Undoubtedly there has been a paradigm shift from the mentality of modernism, the information age is a period of unprecedented collisions of all aspects of life, these collisions have had a meaningful reaction in architectural discourse: from Tschumi’s “events,” Kurokawa’s “symbiosis,” Van Berkel’s “liquid typology,” to Wilken’s “mobilitas loci.” Each one of these articles establishes a new method of operating in regards to the affects the information age has had on contemporary space.

In Tschumi’s Event Architecture his main idea is that the Modern Movement was flawed in its ideology of form follows function; explaining that today any function can occur independently within any typology. Since form is independent of function this ideology of functionalism is proven wrong, he proposes architecture based on juxtapositions that create shock because of their new and unprecedented heterogeneous mixtures of concept, experience, space, use, structure, and superficial image. He believes this type of shock architecture becomes an open ended amalgamation which reflects the current topos; which is similar to the collisions taking place within daily urban life. Urban life is often fragmented, incidental, and allows for non-hierarchical conditions to occur. The richness of architecture is within these collisions of space and event.

Similarities appear to be echoed in the interview with Ben Van Berkel. Tschumi and Van Berkel are struggling with the same issues of intermixing of heterogeneous elements. Van Berkel’s “liquid typology” relates to Tschumi’s juxtaposition, in this case “it is the intensive intermingling of program, events, organizational structuring and architectural formation.” Van Berkel’s organizational structures seem to act as a congealent or glue which acts to hold together the disparate elements (movement, structure, space, use, information…).

Kurokawa’s themes also echo a similar tone to the former two examples. In his thesis of symbiosis he attacks the Modern Movement because of its tendency to establish dualistic oppositions. These dualistic oppositions create a problem for Kurokawa because of their system of reductionism which in the end does not allow for zones of ambiguity. These dualistic oppositions create a hierarchical system where something is either right or wrong, inside or outside, public or private, causing an elimination of chance and ambiguity. The end result is an architecture that is expressed by homogenization and universality. Kurokawa proposes a new ideology for the paradigm shift that has occurred.

His ideology of Life is based on pluralism; allowing for the coexistence of disparate pieces. Kurokawa goes one step further than Tschumi or Van Berkel by defining how these heterogeneous elements can coexist beyond the basic idea of “overlapping” or “juxtaposition.” He introduces the idea of an intermediate zone that allows for an open dialogue to occur from the opposing elements. This zone because it is ambiguous and multivalent has an effect of achieving balance.

Tschumi, Van Berkel and Kurokawa all seem to be searching for a new method or system of connecting the various disparate elements without the creation of an ultimately homogeneous building. They tend to preserve the unique genetic identity of each element while remarkably establishing a building that can be read as a whole. All three give emphasis in their projects to non-programmed circulation as the glue which holds these varying elements together.

This rise in the importance of circulation or connective tissue is related to the technological innovation of mobile networking technologies; as described in the article From Stabilis Loci to Mobilitas Loci. In this article it is clearly made evident that spaces of transit or movement have gained a greater importance in our society primarily due to the affect that mobile networking has had on established space.

What all these writings establish from Tschumi and his “Events,” Kurokawa and Symbiosis, Van Berkel and “Liquid Typology,” Wilken and “Mobilitas Loci, is that...
the way of achieving a cohesive whole from disparate parts is through these spaces of transit, movement, zones of ambiguity which do not have a prescribed function but are open ended (like the streets of Japanese cities) and allow for the unscripted connections. Circulation spaces must become the organizational backbone in conjunction with a system of overlapping layers of people, use, program, and functions as a method of forming highly dynamic interrelationship or negotiations, where the result is a cohesive heterogeneous mixture that expresses contemporary society.
Through the analysis of these 4 ideologies the following diagrams were developed as an interpretation of the main ideas of Tschumi, Kurokawa, Wilken, and Van Berkel. These ideas form the basis of my investigation in the Process section of this thesis.

**Non-hierarchical**
This idea of non-hierarchical organization can be attributed to Tschumi’s “juxtapositions.” It is a shift from traditional hierarchical organization to a new order of meshworks. It is the result of the collision of multiple unrelated systems; programmatic elements, circulatory elements, and architectural elements. More importantly these meshworks begin to form a cohesive whole due to the ambiguous field of elements. This field can be compressed, or expanded without changing the overall structure, this idea relates to Van Berkel’s idea of scalability.

**Open-ended**
An open ended system is one which is non-linear, it is similar to Van Berkel’s idea of fluid space, where there is an endless continuity, where within these spaces it becomes difficult to point out a starting or ending point.

**Multi-valence**
This idea can relate to Kurokawa’s ideas about the Japanese street, it maintains a constant state of flux, allowing multiple, non-similar connections. The dynamism of overlapping programs, people, uses, and functions contributes to an increased level of activity and interaction.
A Rhizome?
What each of these 3 concepts are describing is the idea of a distributed network or rhizome. According to Alexander R. Galloway “the rhizome links many autonomous nodes together in a manner that is neither linear nor hierarchical. Rhizomes are heterogeneous and connective... They are also multiple and asymmetrical.” The following summaries the characteristics of the rhizome according to Deluze and Guattari.
- Rhizome connects point to point via a line.
- Does not begin nor end, always in the middle.
- Rhizome operates on variation, expansion, conquest, capture, offshoots.
- Is acentered and non hierarchical.

Rhizomes occur in nature, they are a "horizontal, usually underground stem that often sends out roots and shoots from its nodes."

This natural organizational system can be seen in the diagram of the distributed network. A distributed network (or the internet, or highway system) according to Galloway is where “each node may connect to any other node... A distributed network is always caught, au milieu, meaning never complete, or integral to itself... Any distributed network is as large or as small as its parent network.”

The qualities the rhizome or distributed network posses, those being: a connection from point to point, no beginning or end, non hierarchical, relate directly to the conclusions drawn from the ideas and research of Tschumi, Kurokawa, Wilken, and Van Berkel (intermediary, multivalence, scaleless, non hierarchical, open ended...etc.).

---

1 Galloway, 33
2 http://www.answers.com/main/ntquery?n=rhizomes&gwp=13
3 Galloway, 34
After further analysis of the three main concepts of open-endedness, non-hierarchical, and multivalence there was a realization that the edge condition becomes an increasingly important element because within this network structure there is an increased amount of boundary or boarder area.

"In translucent urbanism, the attitude toward the boarder, boundary, or edge contrasts with the modern attempt to eliminate these well as with post-modern tendency to fortify them. A translucent urbanism does not eliminate or fortify boundaries, and edges. Rather, it engages and enhances them to reintegrate places without obliterating differences (of people and activities)…”  

Diagrammatically the boundary remains the line of demarcation, but instead of remaining static, it must become dynamic, an increase of activity at the edge, to allow for a negotiation (or connection) to occur between the disparate elements.

In achieving a translucent architecture methods of achieving porosity should must be taken into account. According to Nan Ellin there are a series of porosities: visual, solar, functional, provisional, temporal, historic, ecological, circulatory, experiential, administrative, spatial, urban, symbolic, business, and virtual. Any combination of these porosities allows for an engagement of the building with its surroundings. For Ellin these porosities or “the combination of concealment and revelation renders the city accessible, interesting and lively…” because “it emphasizes bringing the inside performance activity outside.”

It is neither transparency nor opacity, but it is this element of translucency (created by porosity) that in conjunction with the concepts of multivalence, non-hierarchy, and open-endedness come together to form a new mode of organization that becomes appropriate for the information age.

1 Ellin, 82
2 Ellin, 81
6 References
Bibliography


Image List/Credits

1.0  http://www.fhwa.dot.gov/hep10/images/nhsjpg.jpg National Highway System
1.1  Galloway, Distributed Network
1.2  Image by Author
1.3  Image by Author
1.4  Image by Author
1.5  Image by Author
1.6  Image by Author
1.7  Image by Author
1.8  Image by Author
1.9  Image by Author
2.0  Image by Author
2.1  Image by Author
2.2  Image by Author
2.3  Image by Author
2.4  Image by Author
2.5  Image by Author
2.6  Image by Author
2.7  Image by Author
2.8  Image by Author
2.9  Image by Author
3.0  Image by Author
3.1  Image by Author
3.2  Image by Author
3.3  Image by Author
3.4  Image by Author
3.5  Image by Author
3.6  Image by Author
3.7  Image by Author
3.8  Image by Author
3.9  Image by Author
4.0  Image by Author
4.1  Image by Author
4.2  Image by Author
4.3  Image by Author
4.4  Image by Author
4.5  Image by Author
4.6  Image by Author
4.7  Image by Author
4.8  Image by Author
4.9  Image by Author
5.0  Image by Author
5.1  Image by Author
5.2  Image by Author
5.3  Image by Author
5.4  Image by Author
5.5  Image by Author
5.6  Image by Author
5.7  Image by Author
5.8  Image by Author
5.9  Image by Author
Image List/Credits

6.0  Microsoft Local Live, http://maps.live.com/
6.1  Image By Author, Context
6.2  http://www.enquirer.com/editions/2003/06/01/loc_skywalkmap01.html, Skywalk Map
6.3  Image By Author, Diagram
6.4  Image By Author, Diagram
6.5  Image By Author, Diagram
6.6  Image By Author, Diagram
6.7  Image By Author, Diagram
6.8  Image By Author, Diagram
6.9  Image By Author, Diagram
7.0  Image By Author, Diagram
7.1  Image By Author, Diagram
7.2  Image By Author, Diagram
7.3  Image By Author, Diagram
7.4  Image By Author, Diagram
7.5  Image By Author, Diagram
7.6  Image By Author, Diagram
7.7  Image By Author, Diagram
7.8  Image By Author, Diagram
7.9  Image By Author, Diagram
8.0  Carver, Norman F. Form and Space of Japanese Architecture, Engawa
8.1  Image By Author, Diagram
8.2  Image By Author, Diagram
8.3  Image By Author, Diagram
8.4  Image By Author, Diagram
8.5  Image By Author, Diagram
8.6  http://www.archidose.org/Feb99/020199.htm, Photograph
8.7  http://www.archidose.org/Feb99/020199.htm, Photograph
8.8  El Croquis 72, no. Ben Van Berkel (1995), Image
8.9  El Croquis 72, no. Ben Van Berkel (1995), Image
9.0  El Croquis 72, no. Ben Van Berkel (1995), Image
9.1  Ben van Berkel. Un Studio: Unfold, Image
9.2  Ben van Berkel. Un Studio: Unfold, Image
9.3  Ben van Berkel. Un Studio: Unfold, Image
9.4  Image By Author, Diagram
9.5  Image By Author, Diagram
9.6  Image By Author, Diagram
9.7  www.turf.uiuc.edu, Rhizome
9.8  Galloway, Distributed Network
9.9  Image By Author, Diagram
10.0  Image By Author, Diagram
10.1  Image By Author, Diagram
10.2  Image By Author, Diagram
10.3  Image By Author, Diagram
7 Project Images