Executive Summary

Architecture has several functions in Second Life: representational, social and dynamic.


- **Social** – Second Life is a place to meet, and an important role of Architecture is to foster interaction and collaboration among members.

- **Dynamic** – Building not only for the sake of a final product, but also as a social activity: The pods of active users are never finished. The structure as a whole should reflect social dynamics and links within the community.

We propose an extensible cellular building structure inspired by examples from the 1960’ies Metabolist Architecture or Archigram's Plug-In City. Each pod has a volume of 10x10x8m and is arranged into a deformable grid, with plug-in connections on four sides. Members can choose from four templates to start with, but these can be changed completely within the given volume.

We also propose a set of “social utilities” necessary to make such an architectural structure effective. Each pod comes with a basic infrastructure, that provides:

- **Navigation** – social and spatial using a special dynamic map and elevator.

- **Place for Self Expression** – Pods are fully modifiable and recognizable from far away.

- **Social Sensing and Display** – Sensors built into the structure that provide data for displaying popularity of places, update frequencies, etc.

These social utilities transform the pod into a 3d analogy of a profile page: a customizable place for communication, broadcasting, either private or public, as well as being a virtual place that people can visit together.

Design Goals and Challenges

When thinking about designing a system for modular space in Second Life, we identified a number of important challenges that a successful design must address. These challenges fall into a few general categories: presence, history, search, navigation, and governance. Some of these challenges are inherent to any work in Second Life, while some come from the design competition’s particular goals of creating modular space, connectable space for the MIT community. To motivate our design, we will briefly discuss these broad issues.

The representation of the presence of people in online space is an old and well-studied problem. In Second Life, residents rely on the map to find other people and places. While the map represents relative densities of residents well, it doesn’t work very well in spaces that make heavy use of the vertical dimension. We hope to
take more advantage of vertical space in our design so we will need to design better ways to display live presence in three-dimensional space.

Because of the large size of the Second Life grid and relatively few concurrent users, most spaces in Second Life are unoccupied most of the time. This will be exacerbated on the MIT Sim because it’s on an island instead of the mainland, so casual exploratory traffic will be low. As a result, we feel it is important that our design have a way of showing the history of presence in Pods instead of just live presence.

Both historical and live presence representation are important tools for increasing the navigability of the space. On the web, we increasingly rely on the interaction patterns of other people to help us decide what sites to visit. The same is true in Second Life – clusters of people (whether live or historical) are strong signals to other people.

Second Life’s model of space has important implications for search and navigation. Space in Second Life is divided into patches of land. Ownership of land implies ownership of the vertical column of space extruded up from that patch of land. These bits of land also control how people can navigate them by setting rules about how people can move through their space as well as limiting access. Furthermore, patches of land are the fundamental unit addressed by Second Life's search system. These models don't make sense in a Pod-based vision of space because it is unreasonable to expect that each Pod occupies its own vertical column of space. As a result, our design must provide its own search infrastructure for finding interesting content and events, as well as systems for access control and movement between Pods to supplement Second Life's built-in methods.

In any large scale social system, there will be disagreements between Residents. Second Life is no exception. We believe that providing clear governance structures that give people the tools to (when possible) resolve their own problems will be an effective and scalable way to keep the pods largely self-managing.

All of these categories combine to create what we view as the core “social” utilities for modular space in Second Life. By using the architectural elements to provide sensing and display, we can build a rich set of systems that address the challenges we have described.

It is also important to make clear our basic assumptions about prim use patterns. Our biggest limitation is prim count, not volumetric space. With that in mind, our design is fairly low density. By spreading people out we can make pods more useful for each person as well as cutting down on client rendering load by putting some pods beyond the render distance of the client. We also expect that the prims in the pod itself are going to represent a small fraction of the total prims used by pod owners. If pods are to be useful to people, they’re going to want to substantially customize their pods and leave their own objects behind in the space. This makes the prim count of the pods themselves a balance that individual users can manage. If they want to put more stuff in the pod, they can trim away the prims from our pod designs or build their own design up from scratch. Based on these assumptions, we’re not too worried about estimating an exact number of pods we can support. That number is quite flexible depending on how many prims out of the Sim total allocated to pods and their contents and how many pods are allowed to be
built on each parcel. This is also a balance that will be much easier to manage once we have data about how people want to use pods.

In this proposal, we discuss our design in four sections. We start with a discussion of our design of the Pods as a fundamental unit in this system. The Pods interconnect to form larger structures that we call Scraper, adapted from “Skyscrapers”. Each of these structures has its own internal system that handles movement between Pods. A Sim can support many of these structures at once, connected by a sort of monorail system. Each Scraper gets a stop on this system, as does the main Sim entry point. We also some details about what kind of governance systems we think would be effective and how to support them in the architecture of the building itself.

**Pods**

In our design, each Pod will be a flexible space that is owned by a single person. This space can be used for a wide variety of purposes - it could be a workshop, an apartment, a gallery, a store, a classroom, a concert venue, or a storage closet. We make no prescriptions about how these Pods are used. Most of the volume of the Pod is open space which its owner can fill in with whatever they think is appropriate. To start new Pod owners off, we will provide a range of Pod templates for different Pod uses or styles, however, these can be changed completely by the owner.

Beyond space to build, the Pod has a few other major components. Each Pod has a sort of connective tissue that defines how the Pod connects to other Pods and how visitors can travel to the Pod. In the diagram below, we show how these connections relate to the Pod itself. People looking to get their own Pod can connect to any open connection point. Ultimately, we would like to offer different designs and connection rules that promote different Scraper aesthetics. For this proposal, though, we focus on one system in which each Pod has a plus-shaped connector, and allows rotation around the vertical axis at the connection point. This promotes a particular structure that you can see in Figure 2. The Pod’s structure will require very few prims. While there will not be hard limits per Pod, we will provide ways for each Scraper to manage the relative prim usage of its residents.
Figure 1 - Annotated Pod sketch.

To address the issues of presence, navigability, and search, each Pod will have a data collection system that records visits to the Pod. Based on this information, we can visualize how many people are currently in each Pod and how many people have been in the Pod recently. This information will be shown on the Pod itself to make it easy to gauge popularity while browsing the Pods in a Scraper. It will also be transmitted to the Scraper itself.

Scrapers

Scrapers are the "clusters" in our design. They are composed of connected Pods, arranged based on certain rules about the kinds of connections can be made between Pods. Beyond being a collection of Pods, Scrapers also provide two extra features: maps and elevators.

Because Second Life assumes that parcels of land are the basic unit of spatial content, it is important that we provide our own tools for browsing the Pods. We propose creating a model of the Scraper. The presence information collected by the Pods (both live and historical) will be mapped onto the Pods in the map. Each Pod in the map will also display textual information – set by the owner of the Pod – that describes the contents of the Pod. The map will also be able to search these Pod descriptions, lighting up Pods that contain specific search terms.

While it would be easy to make the Pods in the map also act as teleport links to the Pod itself, we think the spatiality of the Scraper is important and want to emphasize the relationships between Pods by providing a kind of glass elevator that
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will follow the junctions that connect the Pods from the base of the Scraper to the Pod a visitor has selected. This trip will provide an overview of the other types of Pods that are in the Scraper, providing a basis for future exploration.

Sim Structure

We envision that there will be more than one Scraper in the Sim. When laying out the MIT Sim, we would place the Scraper lobbies (which serve as a sort of nucleation point for the Scraper) in places that fit with the overall design of the Sim; the Pods will easily coexist with other uses for the Sim. Each of the lobbies will be connected by a track. Small personal cars would take people between different Scrapers in the system. As with the paths within the Scraper, we feel that a path between the Scrapers is important because it provides a sense of context to the Sim as a whole, and might encourage people to visit other places in the Sim that they see while en route to their destination.

Figure 2 - Sketch of a set of Scrapers, demonstrating the range of forms they can evolve into.

We also propose a central informational hub that visitors to the Sim would be teleported to on arrival. For people looking to explore the Pod system, there will be a directory system. Like the maps in the lobby of each Scraper, the Hub will have a map of the entire system. Also like the Scrapers, the Hub will have a search system that works across all the Scrapers.

For people looking to create their own Pods, the Hub will serve as a distribution and education point about the Pod system. It will have Pod vendors and tutorials for setting up the Pod and building in it.

The Hub will also serve as a way of connecting the Second Life search system with interesting content in the Pods. The descriptions of the most visited Pods will be included in the Hub's description, so people searching the Second Life system for content that is popular in a Pod at the moment will be able to find the Hub, and connect from the Hub to the relevant Pod.
Governance

Second Life natively provides a number of governance systems for groups of residents and land owners. We can take advantage of some of these in our design, particularly the group tools. Groups in Second Life have their own system for proposing and voting on group decisions as well as distributing notices. Sims can have covenants that specify rules how a Sim can be used. Unfortunately, these tools have a number of built in assumptions and aren't sophisticated enough for handling governance. In particular, the built-in tools aren’t powerful enough for us to implement per-pod prim limits, or limit people to building just within their pod. Still, we can give the community tools for dealing with the underlying problems that prim limits and build location restriction are meant to solve.

Without getting into too much detail, we think there are a few broad ways in which we can help manage the governance of the Pod system. The first is to make visible the usage patterns of residents. Instead of enforcing strict limits, we can let residents provide pressure to other residents who are using too many prims. So while people will be able to go over their prim allocations, we will make it visible to other residents and let them make it a community issue if they think it’s a problem. If they do want to force the issue, it’s important to provide a clear vocabulary for how administrators will intervene on behalf of residents. We won’t propose a specific set of interventions here, but it might include a range of activities like delisting a pod from the directory, removing content other residents find offensive, temporarily banning someone from the Scraper, cleaning up (by hand) prims over a certain limit, or forcibly removing a Pod from the Scraper. By codifying the relationship between administrators and residents, the residents are free to discuss and resolve problems internally where possible, but request outside intervention when necessary.

There needs to be a venue for these discussions. While we may use the built-in Group Notice system, we may need to build our own system into the architecture of the building itself. Beyond dealing with dispute resolution, these systems could also be used for discussing the continued growth of the building, what to call the building, how to describe its contents, how to set the covenants for the building, and so on.

Future Directions

Looking to the future, we think the biggest area to improve this design is in adding more meaning to proximity of pods and their topology. This is important because it provides more reasons for people to care about where in the Scraper they are and who their neighbors are. This in turn plays a role in making the Scraper a vibrant social space and pushing it beyond the space of a three dimensional profile page.

We have identified a number of ways to achieve this goal. We could provide interfaces for users to link their pods together with a sort of zipline, but only if they're within a certain distance on the tower. This strategy also raises questions about how to deal with people moving their pods to be closer to their friends, which is still an open question in this iteration of the design.

There are also a number of opportunities around using the pod topology as an information network. For example, we could make the pods into game pieces
where each pod owner can set rules about how their pod interacts with other pods. Pod owners could collaborate to create particular patterns across their whole Scraper. There are also possibilities around passing messages through the pod network. In all of these cases, we would make the passage of information through the Scraper network visible by using prims as a kind of physical network packet.

Prototype

Our prototype is on display at:


The current prototypes have rough building capabilities that let you add pods to the existing building following our basic form. There is also an early version of the elevator and map systems, though without the visualization and sensing elements.

We would be pleased give you a tour of our prototype and answer questions about our intent. The prototype is still a work in process, and we think it might be helpful for us to clarify our intent in person. Please feel free to email us at dharry@media.mit.edu and dietmar@media.mit.edu and we can arrange something.

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**Figure 3 - Map of the prototype area.**