Habitat Geographic Master Plan

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to•pol•o•gy
n **1 :** topographical study of a particular place; *specif*: the history of a region as indicated by its topography **2 :** a branch of mathematics that investigates the properties of a geometric configuration (as a point set) that are unaltered if the configuration is subjected to a one-to-one continuous transformation in both directions

to•pog•ra•phy
n **1a :** the art or practice of graphic delineation in detail usually on maps or charts of natural and man-made features of a place or region especially in a way to show their relative positions and elevations **b :** topographical surveying **2a :** the configuration of a surface including its relief and the position of its natural and man-made features **b :** the physical or natural features of an object or entity and their structural relationships

ge•og•ra•phy
n **1 :** a science that deals with the earth and its life; especially : the description of land, sea, air, and the distribution of plant and animal life including man and his industries **2 :** the geographic features of an area **3 :** a treatise on geography **4 :** a delineation or systematic arrangement of constituent elements : CONFIGURATION

Introduction

This document describes the *Habitat* Geographic Master Plan. This plan details the physical model of the *Habitat* world: what the fictional topography is supposed to be, where cities, towns and other Avatar developments are to be located, where highways and roads run, etc. The purpose of the plan is to enable us to manage the growth of the *Habitat* world so that things are added in an orderly, sensible and predictable fashion.

Overall Topology of The Habitat World

Due to the way regions are connected to one another (a directed graph), the topology of the world can be quite arbitrary. In particular, it need not be euclidean. However, in the interest of keeping things comprehensible to the player, we will, as a rule, deviate from a euclidean norm in only a few special sorts of ways. These are:

- Representation of spaces which are psychologically larger than the things they connect to. This includes such things as the interiors of buildings and caves, where a single doorway region can lead to a whole labyrinth. However, the interior and exterior taken by themselves are each euclidean. It is only the connection between them that introduces a non-euclidean element.
- Situations in which there is an implied extra dimension. This includes apartment buildings in which the floors are strung together with elevators. The player's mental model is of a euclidean space, but a three-dimensional one.
- Puzzles in which there is a deliberate effort to mislead the player (e.g., the desert/maze). These should be used sparingly and with care, and there should be some indication to the player that he or she is about to step into an irregular situation.

Keeping the above points in mind, we chose to generate a synthetic topographical map for the *Habitat* world (see fig. 1). The ‘‘natural’’ features, such as mountains, oceans, and so on, have no real meaning in terms of the underlying structural model (i.e., regions). However, they provide a set of constraints for locating cities and other places relative to each other in an interesting and naturalistic manner. They also provide a fantasy rationale for interposing various obstacles between places.

The overall shape of the world is a cylinder. This gives us one axis that wraps around on itself and one axis that is bounded. The wraparound means that Avatar philosophers can argue about whether the world is round or flat while the great Avatar explorers circumnavigate the world to settle the issue. The boundary edges mean that Avatars can run into or fall off of the edge of the world. The ‘‘edge of the world’’ idea is a wonderful source of creative material. The edges can hold sites for a variety of interesting things, such as special reality-maintenance facilities, secret passageways, and the like, that hint at some underlying apparatus supporting the world. Mostly, however, the edges of the world will simply be impassable barriers (either walls or precipices, depending on where one visits). The edges of the cylinder also provide a place to add on if more room is needed.

This plan is predicated on a maximum population of 50,000 Avatars. This number was chosen because it is well in excess of the expected initial population base but not outrageously huge. It is a somewhat arbitrary number, in that it represents a guess about the need for territory that the running system will have. Using the apartment building scheme outlined in previous documents, a typical Avatar city will be set up to support a population of around 2,500, requiring us to have around 20 cities. Of course, we would like the populations to vary a bit in order to keep things interesting, so instead of having 20 cities of 2,500 Avatars each we’ll have some larger and some smaller.

In order to have a reasonable proportion of countryside to urban area, we have chosen (again, somewhat arbitrarily) a typical linear separation between cities of 100 regions. In other words, if an Avatar was to walk from one city to an adjacent one along the connecting road, he would walk through 100 or so regions (TelePorting, of course, jumps over them all in one step). With the present city layout, this results in a total circumference of approximately 1000 regions. Our cylinder is proportioned with a 5:1 ratio of circumference to height, so this makes it about 200 regions high. In terms of human units, if we consider each region to be about 50 feet across, the world would be about 10 miles by 2 miles. This is not huge on a human scale, though it’s quite large by artificial fantasy world standards. And, of course, the effective size is much larger due to the introduction of non-euclidean elements in the topology.

Cities

Referring again to the map: 20 cities are placed in the locations indicated. There is a major road network that passes through or near all 20 cities. The single continuous circum-Habitat highway, ‘‘I-5’’, and its major tributaries form the skeleton of Avatar civilization in Habitat. Note that certain areas are blocked by lakes and seas. Since there are no boats or ships in *Habitat*, these bodies of water are simply impassable obstacles that the roads must go around. Similarly, high mountains and steep grades are avoided. Thus, the roads are channeled into the pathways shown on the map.

The city sites shown are now just locations on a map without cities on them. In the beginning, of course, there will be only one city (Populopolis), but more will appear as the population of the world grows. Here are the cities in the order they are to be added:

Number	Name	Target population	Teleport area code
1	Populopolis	500	pop
2	Quantumgrad	6000	q
3	Strakhenville	3000	str
4	Wasteland City	500	wc
5	Schnozz Point	2500	snzz
6	Port Vilhelm	4500	pv
7	Crossroads	4000	xxx
8	Barstow	500	bar
9	Foonjyo	3000	foon

10	Land's End	3500	end
11	Theodopolis	4500	theo
12	Wilberforce	2500	wil
13	Bratwurst's Folly	1500	bwf
14	Mudhole	1000	mud
15	Opal	1000	opal
16	Gazooka	3500	gaz
17	Eagles' Nest	2500	nest
18	Alpine Grove	2000	alp
19	Fnork Falls	3000	fnf
20	Swamp Flats	500	sf

Each successive city on the list ought to be begun (i.e., Avatars should start occupying it) when the city before it on the list starts to approach about 2/3 of its target population.

Area Codes

Each city is the center of an area code zone for the TelePort system. These zones define the difference between local and long-distance TelePorts: TelePort trips within an area code are local while ones that cross one or more area code boundaries are long-distance. The physical topology of the area code zones themselves is used for computing the distance of long-distance 'Ports and thus the charge. The area code zones are indicated on the map.

Climate and Vegetation

The topographical characteristics of our synthetic scenery suggest a number of distinct climatological zones. While there is no actual weather in *Habitat*, it is helpful, as was the case with the topology, to adopt a convention whereby the characteristics of different parts of the world are constrained in a meaningful way. We have chosen to partition the world into climate zones, each having one of five general climate types. These types in turn suggest the density and type of vegetation that will decorate the scenery in each and the general visual style of undeveloped places. The five climate zones are:

Type	Climate	Features
A	Arid	Desert
B	Semi-arid	Plains and grassland
C	Temperate	Forest
D	Tropical	Jungle
E	Wet	Swamp

Please refer to the climatological map for the areas covered by each type.

The Structure Of Cities

Each of the 20 *Habitat* cities will have a distinct style and personality. This style will be reflected in the way the business and residential districts are laid out, where the streets run, and so on. However, there are some elements that are common to all cities. At a minimum, there are the places that provide the essential support services that Avatars need in order to function in the world. Thus, for example, every city has at least one Oracle fountain. The establishments that support certain heavily used functions may be replicated at various places around the city depending on the size of the population that must be served.

These are the services that each city must provide:

Service	Purpose	Population supported per unit
Fountain	Oracle	1000
Bank	Access to money	250
News stand	Distribution of timely information	250
General store	Distribution of misc. merchandise	500
Body paint shop	Avatar customization	500

Head shop	Avatar customization	500
Furniture shop	Turf customization	500
Pawnshop	Recycling dead objects	500
Library	Access to archival information	500
City Hall	Bureaucratic support services	500
Hall of Records	Distribution of feedback to players	500

"Population supported per unit" is the estimated city population that a given establishment can handle. In other words, the total population of the city divided by this number gives the number of such establishments the city needs. These numbers represent an educated guess and will, in all likelihood, need to be adjusted upward or downward (probably upward) based on the beta-test feedback.

Each city consists of one or more business districts surrounded by residential areas. Each city is located either along or at the end of one of the main roads. This road runs through or immediately adjacent to the business districts. The residential areas are connected to the business districts, either directly or by connecting to the main road just outside them.

A business district consists of various of the essential support establishments described above mixed with other, non-essential businesses (usually associated with things of a recreational nature for the players to do in town), and Avatar-run businesses. The latter begin life as empty storefronts and are assigned to entreprenurially inclined players as the city is populated. Other than the above generalities, there are no hard-and-fast rules about the layout of cities.

A residential district consists of both apartment buildings and houses. However, the bulk of the *Habitat* population will reside in apartments. Since residential areas require large numbers of regions (at least two per player in addition to assorted connecting regions), they will be generated in bulk using semi-automated tools.

Note that not all business establishments nor all turves are necessarily located in the highly planned and organized areas that cities represent. Indeed, we want to spice things up by allowing both commercial and residential regions in the rural areas between cities, as well has having occasional business regions in residential areas and vice-versa. However, in keeping with our mass-audience orientation, these regions will be relatively uncommon and usually reserved for special purposes or for players who are somehow privileged (as a result of either achievement or oracular fiat).

Growth Of Cities

In order to manage the growth of the world we must, among other things, plan how cities are going to grow. Each city will be created in five phases. These are: *layout*, *mapping*, *region design*, *installation* and *population*. We have chosen this phase structure so that we can "pipeline" the creation effort, working on different phases of different cities at any given time. We do not need to create the whole world at once.

Layout

In the *layout* phase we create a skeleton design. This is essentially a sketch map of the city, showing streets and roads, residential and business areas, public areas such as plazas and parks, sites of major buildings, and so on. It will look rather like a Rand-McNally road map of the interstate freeway system: complete, but without a lot of detail. These sketch maps, rendered in an aesthetically pleasing form, can also be used as maps for publication and distribution to the players.

Mapping

In the *mapping* phase we design the specific details of the city's layout. The output of this phase is a detailed map of the city showing essentially all the regions in it, though it need not give the specific interior layout of things like apartment buildings, libraries, and similar places that have simple, standardized insides. The maps generated in this phase will resemble, in both style and level of detail, the present maps of Populopolis and the other realms that we have installed. These were generated fairly quickly and easily on a Macintosh with MacDraw, using stylized mapping symbols which we designed for the purpose (the collection of such symbols will undoubtedly need to be enlarged as we go, but that presents no difficulty). The conventional mapping symbols represent conventional types of regions that we will use as pre-fabricated "building blocks". The map should note any anomalous regions that will require individual human

attention.

Region design

In the *region design* phase we create the actual regions that will be required in order to construct the city. This creation process can take a number of forms, corresponding to the level effort called for, which in turn depends on the nature and quantity of the particular types of regions desired.

At the lowest level of effort are stochastic region generators. These are utility programs that generate random regions of particular types according to simple statistical rules. These can create simple regions that are required in large numbers. Such regions may include turf interiors, tract house fronts, road and highway regions, forest regions, and so on. These sorts of programs do not produce regions of great interest, but that is not their purpose. Their purpose is to generate quantity.

A level above stochastically generated regions are library regions. These are regions that were individually designed and then saved in a library for re-use. They have more character than randomly generated regions (since they were, once upon a time, designed by a human being), but they still serve the cause of quantity in that we will use them over and over again. Library regions include such things as turf interiors (we currently have 120 or so individually designed turf interiors) as well as store fronts and the like.

The next level of effort involves what we might call ‘‘semi-custom’’ regions. These are regions that are either created stochastically or extracted from the library, and then hand customized to give them individual identities or to adapt them to particular purposes. This customization can range from simply changing the color of a wall or the text on a sign to extensive redesign.

At the highest level of effort are ‘‘fully-custom’’ regions. These are regions that are created from scratch for a particular purpose with our region editor or with the Reno utility (when it becomes available). Since they are custom designed, they can be exactly fitted to their particular purpose or place, but at a relatively high cost in time and effort.

The job of creating cities for thousands of Avatars is clearly a large one. To make the job tractable we will, of course, want to push as much of it down to as low a level in the aforementioned hierarchy as possible. The strategy is to use automated tools and standard building blocks for bulk and hand-made regions for seasoning.

The final output of the region design phase is a collection of regions. This collection takes the form of raw data files that will be fed into the later phases of the city creation process. This includes the data that specifies how the regions are to be connected and oriented with respect to one another.

Installation

In the *installation* phase we generate the actual regions on the host. This includes running the data files generated in the previous phase through various translating programs in order to produce the final description files suitable for transfer to the Stratus. These files are then uploaded to the host system and run through additional translating programs that result in the actual database entries which *Habitat* uses. The city is initially created in ‘‘limbo’’, disconnected from the rest of the world, in the sense that it is unreachable by ordinary Avatars. However, by virtue of our privileged powers over the database, it is not unreachable to us. We make a walking tour of the new real estate with an Avatar of our own in order to verify that all is as it should be. Any glitches that may have crept into the process are noted and corrected, and the new city is manually connected to the rest of the universe at the place designated on the master map of the world.

Population

In the *population* phase we add the new turves of the new city to the system’s list of unassigned turf regions and begin assigning these regions to new players. The city starts to fill up with inhabitants and come to life. We announce the presence of the city to the rest of the world, encouraging the enterprising and the larcenous to come and set up shop. The system operator handling allocations of business property has a busy couple of days putting people in business in the new downtown, and then the city is alive.

Roads

As previously mentioned, the cities of *Habitat* are connected by a road network. There is a major world circling thoroughfare (named ‘‘I-5’’, in honor of the real world’s best example of a highway through

nowhere) and several secondary roads. The purpose of these roads is not so much to serve as a transportation network — TelePorts do the job much more quickly and conveniently — but to act as a skeleton on which to hang new realms. The roads act as leading lines, enticing the players out of the cities on journeys of exploration.

A road is realized in the world database by an unbroken chain of connecting regions, each of which has a road object running through it indicating the path of travel. Typical road length between cities is on the order of 100 regions. This means that to represent the entire road network as presently designed we will have to generate some 2,500 or so road regions. In addition, we would like to have one or two regions of wilderness on each side of the road running in parallel with it, to give the narrow strip at least a little depth. This will require an another 5,000 to 10,000 regions. However, as with much of the cities themselves, the large number of regions required can be generated using stochastic methods and library regions.

The road network should be generated along with the cities. The regions created for a city should include that city's share of the road network — the roads extending in all directions from the city, halfway to any neighboring cities. If the neighboring cities exist, the roads extending outward from the new city will just connect up. If a neighboring city doesn't exist yet, then the road in that direction just ends out in the wilderness with a construction zone region.

New Realms

A *realm*, in the terminology we have adopted, is a collection of connected regions created together for the purpose of some activity or adventure. Expansion of the world beyond the basic skeletal structure consists of the creation of new realms. The process of realm creation is much like that of city creation, except that there will generally be less homogeneity and consequently fewer opportunities to use the various labor saving region generation techniques described above. However, it is not the purpose of this document to discuss where realms come from so much as where they go.

Broadly speaking, a new realm can be ''attached'' to one of four places: directly to a city, to the skeletal road network, to some other realm, or to nothing at all (i.e., accessible only through TelePort). The choice of the most appropriate connection point will depend on the theme of the new realm and on available connection points. For example, a wilderness realm probably should be attached to the road network somewhere out in the hinterlands, while a realm that represented the ruins of an abandoned city could be attached either to the road or to an existing city. Realms connecting to other realms should build upon one another. Realms that are not connected to anything at all should either represent places that are truly remote and inaccessible (such as islands or distant mountaintops) or places whose existence is ethereal or abstract (e.g., Avatar Hell, the moons of *Habitat*, or the West Pole). It is also reasonable to build additional roads that branch off of the main road network to lead to interesting places.

Appendix A: Notes on the 20 Habitat cities

Populopolis

Populopolis is *Habitat*'s first city. It is named ''Populopolis'' because of its immense size (it's as small as cities in *Habitat* come).

Quantumgrad

Quantumgrad is where the ''War to End All Wars, I Think'' started and ended. It features a number of historical monuments commemorating various events from the era when Fredrich the Ill-Mannered attempted to overthrow the Oracle and establish an ''Avatars' Paradise''. It is also *Habitat*'s largest city.

Strakhenville

Strakhenville is a city that prides itself in being rich in *strakh*. Strakh, of course, is the opposite of *strumph*.

Wasteland City

Wasteland City is located in the middle of the desert, hence the name. Though small, it has a reputation for toughness and macho. It is a place where Real Avatars can feel at home.

Schnozz Point

The city of Schnozz Point is located on the tip of the peninsula of the same name. The origin of the peninsula's name is obvious if you look at the map.

Port Vilhelm

Port Vilhelm was built as a seaport by the eccentric *Habitat* zillionaire, Vilhelm Von Voorzsimmer (after whom *Habitat*'s greatest honor, the Voozsimmer Award For Distinguishable Service, is named). Unfortunately, a seaport doesn't make much sense in *Habitat*, since there are no ships. Fortunately, no one in Port Vilhelm has noticed this and the city thrives. In Port Vilhelm it is conventional for Avatars to greet each other by saying, ''Hello sailor''.

Crossroads

Crossroads is located at a major crossroad. The Avatars who live there have an undeserved reputation for not being very creative.

Barstow

Barstow is a place people go through on their way to someplace else. That's why it's not very big.

Foonjyo

Foonjyo rests in the shadow of Mt. Foonji, the highest point in *Habitat*. Mt. Foonji is reputed to be the site of numerous mysterious and mystical goings on, and so Foonjyo is a haven for mystics and religious weirdos of all sorts.

Land's End

Land's End is where the land ends, at least if you are walking south.

Theodopolis

Theodopolis is where Theodophilus lives. Try to say ''Theodophilus lives in Theodopolis'' ten times fast.

Wilberforce

Wilberforce is a farming town. Primary crops are heads and mayonnaise.

Bratwurst's Folly

Due to the pattern of the TelePort area code zones, Bratwurst's Folly is the most remote city in *Habitat*, even travelling by TelePort. That's why folks thought it was folly for Bratwurst to build a town there. They were wrong — the place is a haven for artists and poets who want to get away from it all and for criminals and fugitives from justice of all sorts.

Mudhole

Mudhole is next to a big mud hole. Its inhabitants are considered ‘‘eccentric’’.

Opal

Opal is a mining town, known for gemstones of all sorts.

Gazooka

Gazooka has no explanation for its name. Ya wanna make something of it?

Eagles' Nest

Eagles' Nest is located in the foothills of some of *Habitat*'s more mountainous country. The folks there keep hoping that there will be eagles in *Habitat* some day.

Alpine Grove

Alpine Grove is located in woods up in the hills. It's a nice place.

Fnork Falls

Fnork Falls in not named after any waterfalls, since there are no waterfalls in *Habitat*. It was settled by refugees from Montana, where they like to name towns Somethingorother Falls.

Swamp Flats

Swamp Flats was built in a flat spot in a swamp.

Appendix B: Interesting places that don’t exist yet

Avatar Hell
The West pole
The Control Center For The Whole World
Mt. Foonji
The Mudhole mudhole
The moons of *Habitat*
The Great Enchanted Art Deco Caves
Jack’s Head Farm