

Metaverse Urbanism

Spatialization Takes Command

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ABSTRACT

The Metaverse is the Spatial internet and all that it takes to make it happen, it is the convergence of the internet of spaces and ownership; a shift towards a mass-personalized, experiential, and gamified internet and stakeholder economy, expanding a global financial agency that expands the market plane.

Crucially, the Metaverse owes its existence to the physical infrastructure that enables it. Despite its apparent virtual nature, the proposed Metaverse exerts a profound influence on the physical world, not only through its infrastructure but also by reshaping our approach to the augmented approach to reality itself, and therefore, design.

As a consequence, these transformative changes necessitate a reimagining of the urban. Just as with any invasive and disruptive technology, this evolution calls for a new urbanism – one that is adaptable to the current technosphere and redefines urban design within this context.

Metaverse urbanism encompasses both the design of virtual cities and that of physical cities to respond to and leverage technologies that enable immersive engagement. It is the urbanism of the fourth industrial revolution, marking a significant shift in the way we perceive and construct our urban environments.

This paper makes context by defining the metaverse and illustrating potential design strategies that define the next generation of Urbanism.

KEYWORDS

Metaverse, Spatial Web, Urbanism, Phygital, Internet

SESSION

CO-DESIGN & LIVING

1. INTRODUCTION

With the creation of the first webpage and the release of the World Wide Web (WWW) by CERN in 1991, the modern era of the Internet was kicked off. Initially non-graphic-text-based-, until MOSAIC, 1993, the internet disrupted multiple sectors and domains and continued to evolve to become what we know today.

Multimedia changed the face of the internet in 1992 when the number of hosts broke one million. Shortly after, in 1993, the number of hosts peaked at 2 Million with 600 WWW sites. This trend continued upward, hitting over 12 million users by the time WIFI was invented in 1997, and Google emerged in 1998.

This decade was a time of building the internet itself, inventing and deploying technologies that enabled it, and setting the stage for mass adoption. The end of the 90s marked the end of what is referred to as Web 1.0. Over twenty years of an internet that heavily relied on big desktop computers, wired internet connections, technically challenging interfaces, and no ecosystem or intuitive interface for democratic content creation.

The year 2000 was a pivotal moment with the .com bubble burst, defining a new age within the internet's timeline. "Web 2.0" was coined by Darcy DiNucci a year before the bubble burst, and was perhaps a just-on-time term to close gates on the previous decade. The term became widely used with the emergence of new platforms, websites, and Rich Internet Applications (RIA) that were highly interactive and user-driven, then became popular around 2004.

Wikipedia, Facebook, and Twitter, coupled with the smartphone were the beginning of a snowball, signaling an era of social media. The internet became a platform-based digital place that connected people, attracting Hillary Clinton to get on board early with YouTube campaign videos, and Ron Paul to set a fundraising record of \$4.3 Million in a single day.

This was the second decade of the internet, where platforms pioneered the scene, and the internet became an internet of people. A landmark event we might all remember is the iPhone reveal of 2007, that's where the ball started rolling.

"There's an app for that!"

A 2009 iconic campaign catchphrase by Apple, a year before 2010, where the word 'App' was voted "Word of the Year" clearing the way to a third decade in the life of the internet, built primarily upon the mass adoption of the smartphone.

Pocket-sized "Black Mirrors" took over the world, transforming how we interact, see, and use the world. With the mass adoption of smartphones, the "There's an app for

that!" became a self-fulfilling prophecy that dominated the third decade of the internet.

The Smartphone-App combo took over address books, pocket watches, loyalty cards, cash, keys, IDs, portrait photos of loved ones, pocketbooks, small notepads, and maps. It dematerialized a lot of what was thought to be, forever physical. Most importantly, it changed how we interacted with our world presence. In a way, Apps offered a solution for anything, almost.

Apps then evolved from "functional" to playing a game or looking at a map or making a transaction, to interactive. Now users can share information, and the smartphones themselves, collect data, the smartphone-user network has become a sensing mesh almost covering the planet. Smartphones were not only connected to the internet, but to other devices and objects, and similarly, other devices within the same network, from homes to satellites.

The Internet of Things was born, or more precisely, the third decade of the Internet - the Internet of Things, building a third layer of connectivity, interactivity, and complexity to the Internet.

With hyper-connected users, smart homes; moving the dial-up produces "smart cities" a brand name for tech-heavy hyperconnected urban environments.

Now with a mature infrastructure, well-established platforms, killer apps on one hand, and record adoption, online communities, and capacity for monetization on the other, a glue that brought everything together was the democratization of content creation tools through the platforms and Apps.

While users were able to feed in basic information, publicly share an image, or add a place on a Map, with the emergence of the creator's economy, a new type of user emerged; the prosumers. A user base that is simultaneously a consumer and a producer of content.

The second and third decades examined - 2000-2020- mark the Web 2.0 phase of the internet, powered with a wireless internet connection, growing cloud infrastructure, smaller and mobile computers, versatile interfacing, a new creator economy, and an abundance of data.

Looking back at the macro scale, the creators' economy has reached a peak in tandem with breakthroughs in high-speed internet, advances in graphics technology, development of virtual reality technology, and Increased computing power. These main enablers, where it became possible to transmit large amounts of data quickly and efficiently, to create advanced graphics and even 3D animations, to create virtual

environments that can be experienced in a more immersive way, and to produce more complex and sophisticated virtual environments.

The fourth decade of the internet and the WWW is an era of content, fueled by a creators' economy that responds to an attention economy that is only growing.

As we examine the 4th decade, we can track an evolution where the internet and the WWW grew to an increasingly interactive, visual, and immersive, from text-based to technical to graphical, reaching interactive 2D and finally, 3D.

The ultimate engaging and immersive experience, in other words, the most natural and holistic, is spatial experience. The internet will only become increasingly spatial.

- Web 1.0 (The Foundational Static Web) - The Internet of Databases and Information

Mainly connects nodes of databases, in a simple manner, and moves from the 'internets' to the Internet. HTTP, HTML, Websites, emails, etc.

- Web 2.0 (The mass-adopted Interactive Web) - The Internet of People

With the emergence of platforms, not only do people get better connected with databases but also between them, creating the Internet of people and social media.

The Internet of Things

The last frontier was things, once that got connected, be it phones, energy generators, cars, and even thermostats.

-Web 3.0, The Internet of Places and Ownership

The next 10 years will be the next shift in the Internet's history, towards an Internet of places, or spaces. The promise brings with it the internet of ownership too, with blockchain technologies and identity social innovation taking place. Blockchain, Edge, Ai, XR, etc.

2. METAVERSE URBANISM?

2.1 THE METAVERSE

Hence the Metaverse is the Spatial internet and all that it takes to make it happen, it is the convergence of the internet of spaces and ownership; a shift towards a mass-personalized, experiential, and gamified internet and stakeholder economy, expanding a global financial agency that expands the market plane.

It is the expansion of the internet to consume the urban, and the expansion of the Urban beyond the physical. It is where physics is optional, yet seductive.

2.2 URBANISM

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Metaverse Urbanism

Beyond the definitions and domains within the last 200 years of urbanism, Urbanism, urban design, and planning, the current technosphere demands a new definition of what the discourse of urbanism is. Just like every discourse, it changes and grows in different directions to answer new challenges, internal and external.

Within the current challenges, and building on past endeavors, We define urbanism as the multifaceted study and practice of understanding, designing, and managing the complex spatial interplay of human societies, built environments, natural systems, and cultural expressions within urban areas. It is the framing of social life through spatial operations such as spatial hierarchies, forms, etc. It docks on all aspects such as the physical, social, economic, environmental, and cultural dimensions of urban life.

2.3 METAVERSE URBANISM

Metaverse urbanism is the realization that the virtual is real. It is the augmented discourse that surrenders to the new umwelt, a stack of infinite layers that we unlock with every sensing technology emerging. It is both the design of virtual urbanspheres and the design of physical ones, with an augmented layer. The metaverse is phygital.

World-building is at the core of both architecture and urban design practices. Virtual-world building on the other hand is an aspect within discourse that this paper will highlight through the case of the Gamium City-World

The Gamium City project is a world-creation project that conceives a city as a world, and vice versa for the Gamium Metaverse project.

"The city is like a great house, and the house in its turn a small city. - Leon Battista Alberti

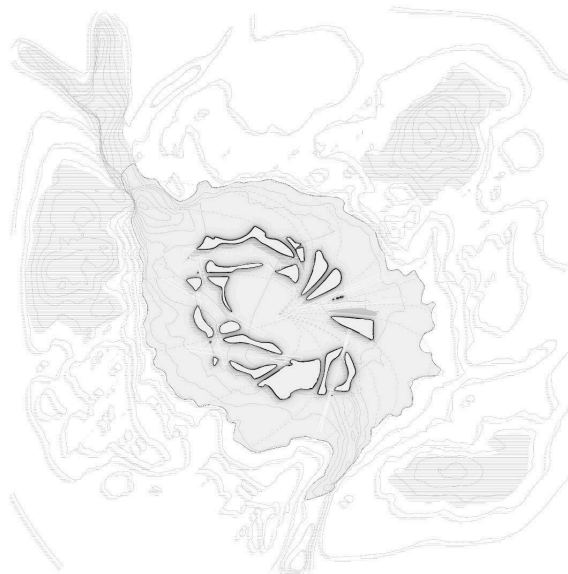


Fig 01 – Examples of the city-world design – first experiments – Property of *Spatial Forces*.

The scale of cities is to a very large extent governed by the slowness of the physical realization of the built environment, in addition to territorial, economic, and population constraints. In the virtual world, the driver is a market-based workflow where quantity is quality; more is more.

Architecture, or world-building in general is an endeavor carried out within another world, always. All worlds belong to some world that forms the external, architecture is about defining the limits.

In the virtual world, spatial definition sways across the boundaries of definition. A city can occupy a whole world. The world becomes the city itself. City as a world, or world and a city.

The city-world is a city that exhausts its full context and a world that can be reduced to a city.

The scale of operation covering urban planning and design occurs simultaneously to conceive a world that is worked out as a city. Cyberspace as a network of virtual cities becomes the world as a network of worlds, the metaverse is plural, open, and interconnected.

It is a design for a configurable city-world, made of 10 neighborhoods*, realized in using the Unity game engine.

The seemingly blank tabula rasa situation brings important decisions to be made on building such cities of the present future while lacking a history of precedents, and constraining context.

The zero-context is not blank.

The Gamium city-world is made of ten neighborhoods, each made up of island(s) in a lagoon of an area over 100 square kilometers – the size of Moscow[TTK]- surrounded by mountainous terrain. The underlying urban strategy / spatial structure of the project is a fractal branching system that draws zones at nodes as it branches out. After the branching and nodes occur, hence the spatial layout, clustering of the nodes brings forward agglomerations of land as chunks that are then partitioned following directionality and proximity from other nodes and a loop connection that connects all the clusters.

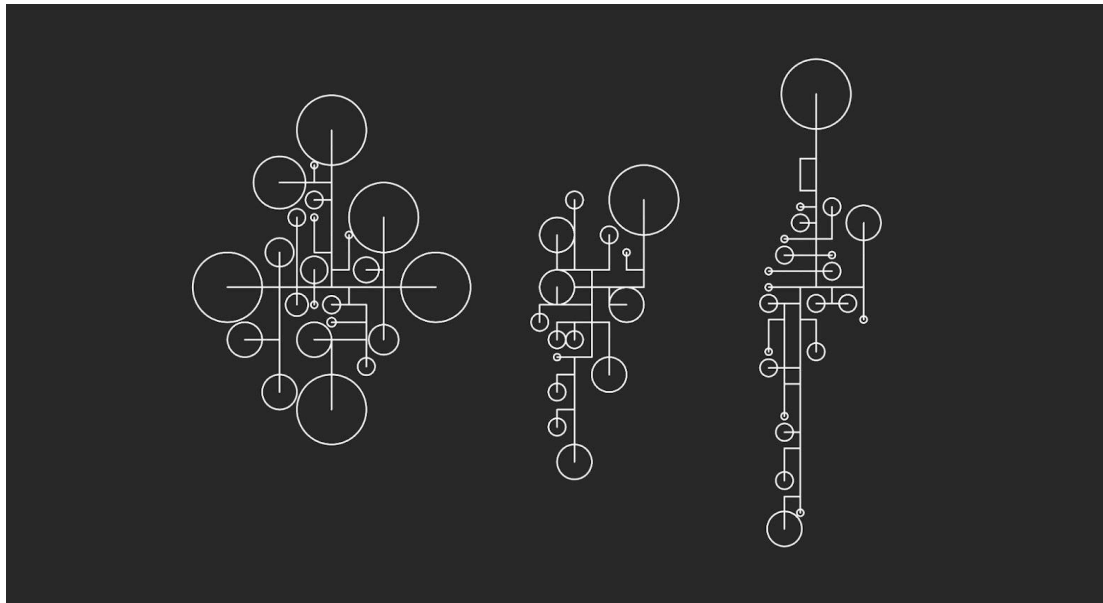


Fig 02 - Automated Urban Morphology Simulations at the strategic scale - Property of *Spatial Forces*.

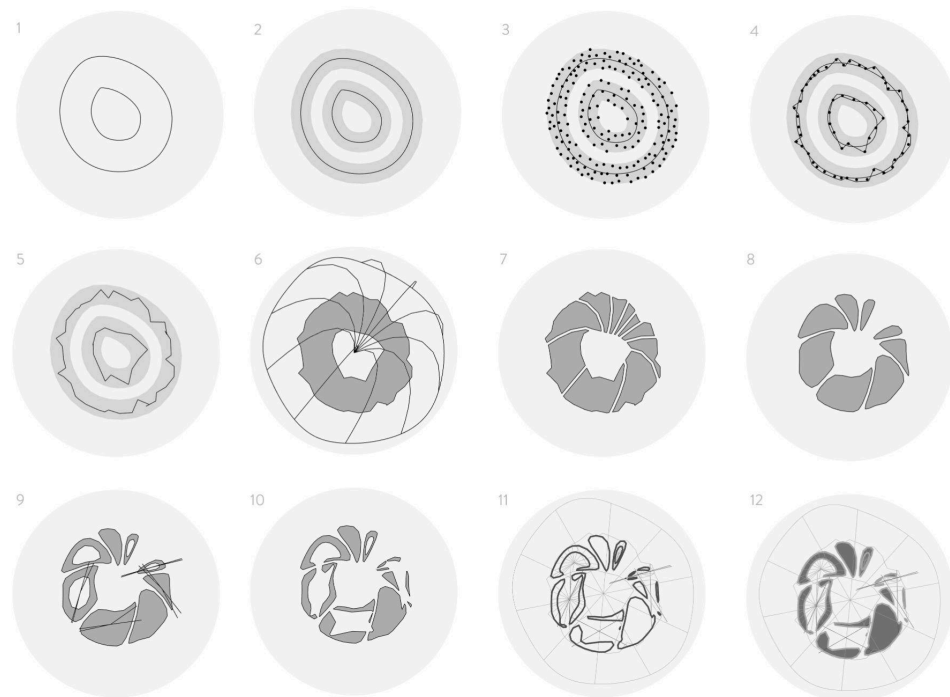


Fig 03 - Other studied approaches as operational design strategies - Automated Urban Morphology Simulations - Property of *Spatial Forces*.

2.3.1 THE RULES:

- Starting from a center point, a random number of branches are drawn with a minimum length, until 10 nodes are reached.

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- At the endpoint of these branches, a node is created, with a radius smaller than the length of the branch
- After the circles are drawn, a second cycle of branches is made while maintaining a minimum distance between secondary and primary nodes.
- At the endpoints of the secondary branches, circles are drawn with a radius smaller than the minimum distance to the closest limitation.
- Once primary and secondary circles are established, a clustering process is deforming the perfect geometries into organic integrated forms.

Ground zero is designing, pre-designing, it is an artificial representation of the need for a context and its necessity even as a made-up.

Most importantly, it is made up along the lines of the politics of the Metaverse city world.

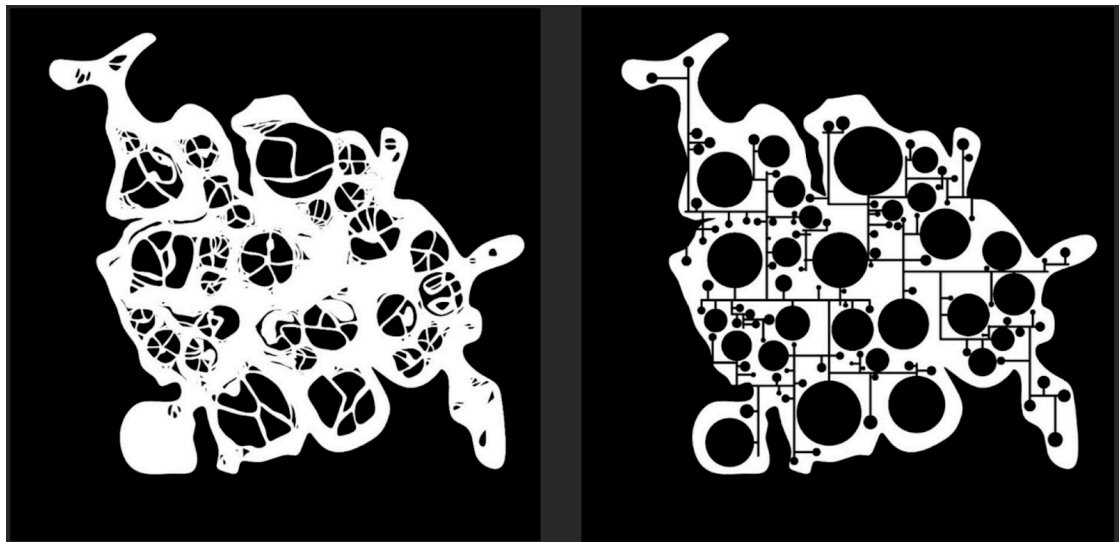


Fig 04 – Automated Urban Morphology Code Application to the Gamium City World Context – Property of *Spatial Forces*.

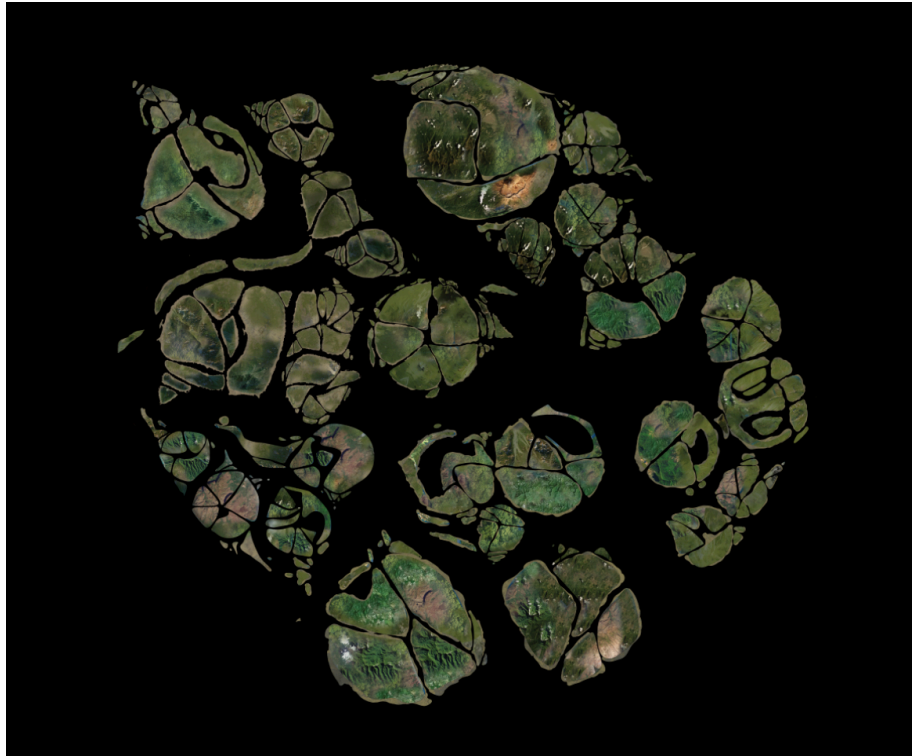


Fig 04 - Visualization of "Ground Zero" the imaginary generated context of the 10 island-neighborhoods of The Gamium City World - Property of *Spatial Forces*.

2.3.2 SPATIAL HIERARCHY

The spatial hierarchy within the generated morphology follows a scale-based organization clustering for social framing bound by district scale and world scale. Each level within this structure proposes a social framing that is nested within the next one. District, Island, Neighborhood, World.

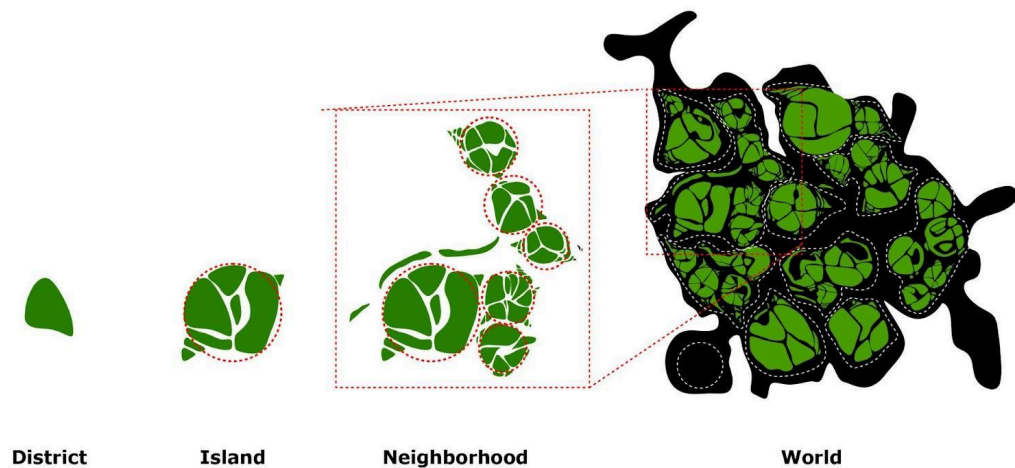


Fig 05 - Spatial Hierarchy of the City-World across scale, from the district to the World - Property of *Spatial Forces*.

2.3.3 LANDS

Within the virtual, lands are virtual real-estate assets. The lands are modeled within a hierarchical clustering approach where different land types have different scarcities, and neighbors while optimizing positions, views, and proximity from wanted locations.

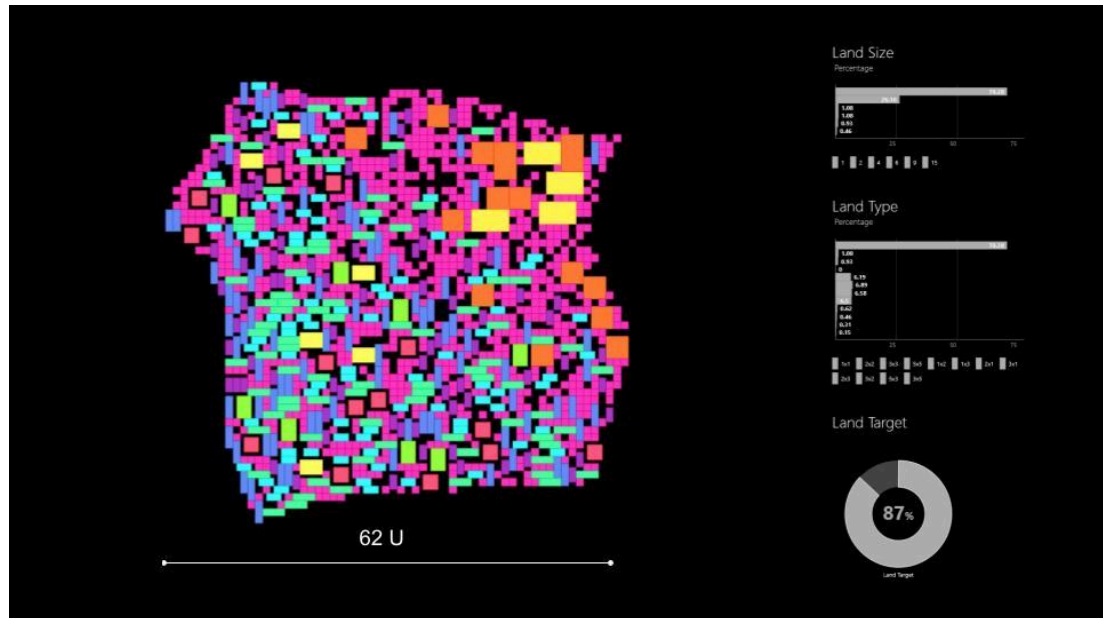


Fig 06 - Land distribution based on parameters and possible assembly systems - Property of *Spatial Forces*.

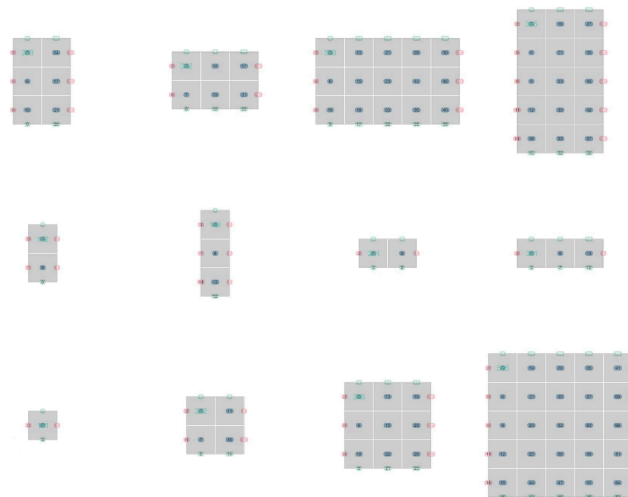


Fig 07 - Land types and possible assembly systems - Property of *Spatial Forces*.



Fig 08 – The Creation and Distribution of Lands within the Gamium City World – Property of *Spatial Forces*.

2.3.4 GENESIS

At the center of the Gamium City-World, Genesis, the neighborhood zero sits as the icon of the Gamium world. A present and monumental urban formation that comes together and curls up at the center to shape the Genesis Tower.

gradually grows in height towards the periphery. With emblematic buildings, the neighborhood has low footprint density allowing for wild green areas, phenomenal public space with sculptures, and game areas for social interaction. On its peripheries, where heights arrive at their highest level [aside from the central tower] the neighborhood hosts designer buildings that will mark the interface between it and the rest of the plan.



Fig 09 - The Genesis Neighborhood - Property of *Spatial Forces*.

Urban Morphology

The urban design is dictated by an organic grid following a field of vectors - forces, that open up towards the periphery, and allow a hybrid, aerated, and high-quality urban space. It has a central iconic tower, connecting the islands of the neighborhood. This neighborhood must include sculptures at the urban scale and game areas for social interaction. At the center, is the Genesis tower that ties together the islands, at the second radial level, public squares, and open space, that lead to the major buildings of the neighborhood. Beyond the buildings, nature takes over creating a belt of parks, and pocket forests, populated with sculptures and specific buildings, arriving at the periphery with light sculptures and vertical assets. The neighborhood has a port at its north water axis, which will host water drones, marine vehicles, boats, etc.

Genesis is planned through an organic grid following a field of vectors, that open up towards the periphery, and allow a hybrid, open, and high-quality urban space.

It has a central iconic tower, connecting the districts of the neighborhood. This neighborhood includes sculptures at the urban scale and game areas for social interaction.



Fig 10 - Urban morphology and functional zoning of the Genesis Neighborhood - Property of *Spatial Forces*.

2.4 CONCLUSION

In this exploration of the internet's evolution, we've witnessed its transition from the static Web 1.0 to the immersive Web 3.0, characterized by the emergence of the metaverse. The metaverse bridges the gap between the digital and physical worlds, heralding a new era in spatiality, the internet, ownership, and urbanism.

Metaverse urbanism presents an opportunity to redefine our understanding of urban environments. It blurs the boundaries between the real and virtual, offering a dynamic landscape for exploring an urban reality beyond the physical, a way to bring in the digital and the virtual in a constructive and holistic manner.

The next generation of cities and the internet will intertwine, as cities become more hyperconnected, and the internet becomes more spatial. Metaverse urbanism is the discourse that studies both in all directions.

The Gamium city-world and the Genesis neighborhood demonstrate an attempt at the craft of virtual city-making.

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