# Myzel – Selforganization in Networked Worlds

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## Abstract

*Using a Proof of Concept (PoC) of Myzel, we tested a new concept for an online community game. In contrast to existing simulation games Myzel allows the players to negotiate and change the rules of their virtual world. Apart from minor technical restrictions they have to create rules for legislation, resources, economy political organizations and other areas. This should help players to understand the complex inner workings of modern societies. Myzel's PoC was developed with the help of a small test community using extreme programming techniques. The PoC was tested in a controlled environment as well as in a free scenario. The results proved the validity of the game concept in most aspects. With small adaptations and a state-of-the-art user interface, Myzel should develop a great selforganized virtual society.*

## Keywords

*Design and analysis of games, online game, massive multiplayer game, community game, virtual societies, simulation game, extreme programming*

## INTRODUCTION

In times of large changes in society straightforward explanations of the world draw increased attention. These offer simple answers to complex questions of life. In many cases such theories have a racist background, sometimes even a fascist one.

 Proceedings of Computer Games and Digital Cultures Conference,ed. Frans Mäyrä. Tampere: Tampere University Press, 2002. 

In the 1990s when Neo-Nazi computer games appeared in the German speaking countries, a group named backbone.interactive was formed at the Institut für Gestaltungs- und Wirkungsforschung (Institute for Design and Assessment of Technology, Vienna University of Technology). They developed the single player adventure game *Der Name des Bruders* where players had to bring down a dictatorial regime. With the appearance of multiplayer gaming on the Internet new opportunities to demonstrate the inner workings of societies in a playful way emerged.



When people are confronted with problems, there are often conflicts of interests among groups in society. However in their daily conflicts most people never get in contact with organized groups of interest. So they must speculate about motives and goals of such organizations. Virtual societies give them the opportunity to get in direct contact with these groups and to see and understand the foundations of society and the evening out of different interests.

The main goal of *Myzel* is to allow players to easily experience the complex inner workings of society in a playground for democracy. So they can experiment with the various functions and even see the results of antidemocratic developments. To give the players a realistic experience, we choose to create a highly developed society as background for *Myzel*.

Starting July 2000 backbone.interactive developed and tested a *Proof of Concept* (PoC) for *Myzel*. The PoC was supported by the Ministerium für Bildung, Wissenschaft und Kultur (Ministry for Education, Science and Culture).

## BASIC IDEAS AND PRINCIPLES

*Myzel* tries to show the most important aspects of our current society using a computer game system. It creates a very flexible dynamic environment in which the complex interconnections of economy, politics and society are simulated. So the players can develop a virtual society in a selforganized way [2]. Special emphasis is put on the role of information flows and media in a society. This results in a mixture of simulation game and virtual community software. When you join the game, your first priority is to survive. Later you will discover the value of coordinated efforts to create and nurture a society to help the survival of all players.

To reach that goal, the game has the following features:

1. Freely definable rules – their obedience has to be controlled by the players themselves.
2. General source of energy – it can be used for food, building and production.
3. Free flow of information – players have to control the flow of information.

4. Organizational units – players can organize themselves in smaller or larger groups. States are predefined organizations.

In real life laws define the rules of societies. Various mechanisms exist to change existing laws or to create new ones. For the coexistence of people there are no immutable rules. The laws are adjusted to the varying conditions of the environment. Absolute rules exist only as nature's laws, but they play a rather minor role in societies [1,4].



To emulate this behavior of societies, *Myzel* uses no fixed rules: the players themselves have to create, change and execute them. They have to define what is allowed and what is not, and which sanctions are used when they break the rules. Even the process of creating a rule has to be defined by the players. So any form of society can be realized [9].

In real societies, people are organized in groups of interest. People choose to or are forced to organize themselves in groups. Depending on size, background and support these groups have more or less power to influence the development of a society. Groups of interest in the real world are e.g. companies, political parties or states [1, 7].

The initial fields of production are energy supply and media. To get access to a planet's energy, a refinery has to be built and the energy has to be transported to the consumers via pipelines. The media producers have to build a production-machinery, which allows creating and transporting media content to the consumers. Furthermore exist a "book of rules" where the laws of a planet can be stored for all players to read.

So there are four roles for players of *Myzel* that are initially defined:

1. Producers and suppliers of energy
2. Producers of media
3. People who create content for the media (journalists)
4. People who create and execute the law (politicians and judges)

The players themselves can freely define more roles. This helps them build successful societies.

## CONCEPT

In the following several terms of the game's world will be defined. These terms are marked with *italics* where they appear for the first time and with capitals later on to make them easier to distinguish from real world items.

The world of *Myzel* represents a not so distant future. Several clever inventions made space travel easily accessible for everyone. Energy is now much more generally usable: you can convert it into any form needed – food, clothes, furniture and buildings.

## Physical World

The world of *Myzel* is a *Universe* consisting of a number of *Planets*. Each planet can be "discovered" by the development team. You need system access and development skills to create a new planet. Planets have a certain fixed size defined in *Areas*: geometrically the planets are doughnuts. Coordinates wrap around in X and in Y direction. Space travel between planets is possible via "beam devices" called *Interstellar Gates*.

Planets have a fixed number of *Sources*. Each area can have one source. With the help of *Refineries* you can extract energy in form of *Force* from the sources. Force is generic form of energy that can be used for the creation of buildings, food and other goods. Sources contain a defined amount of force. While a refinery empties one source, a new one is growing on another area of the planet. There is a threshold named *Novac-Factor*, which defines the minimum force level for a source needed to be usable for a refinery. This prevents planets where all areas contain very small sources and refineries, leaving no areas free for the growth of new sources.



Refineries transform raw force into consumable forms. From the refineries force gets transported via *Pipes* to *Converters*. Converters can be used with their respective *Key*, which their builder gets automatically after the converter is built. Keys can be duplicated using the converter so that more than one player can use the same converter. Keys are used in *Myzel* to implement a very flexible concept of ownership. Object that need some form of access control are operated using keys. The creator of such an object gets a matching key, so she/he is the one who can use the newly built object. If she/he wants other players to share the control of the said object she/he can duplicate the key using a converter and give the new key away. Using this mechanism, *Myzel* does not need to track owners of objects, just their physical location.

Using the converter various things can be built, needing different amounts of force. First of all you can build a *Building*. A building is created in one area but there can be many buildings in the same area. A building consists of one *Room* and has one *Door* with a matching key. Buildings cannot contain other buildings and it is not possible to connect them. These are technical limitations of the PoC and will be subject to change in a full version. Another use of the converter is the creation of *Things*. There are three kinds of things: things that can be carried around (*movable*), things that can't be carried (*unmovable*) and things that are permanently marked by their creator (*signed*). The *Signed Things* are movable and can be signed by various players. The signatures cannot be deleted or faked; the system guarantees their authenticity. Therefore they can be used as contracts or other legal documents. Beside refineries and things *Publishers* can be built with the converter. They will be discussed in more detail later.

All items of the world except planets are exposed to *Wear*, the natural aging process. So all items must be regularly repaired to continue working. Each type of item has its own wear time.

The player characters themselves must eat regularly otherwise they die of hunger. Furthermore regular social contacts (talking to other players) are essential or they die of social isolation. This was implemented to guarantee that players must get in contact with each other's and that they have to log in regularly. We believe this will lead to better gameplay and stronger communities. To allow players to "park" their avatars while going to vacation or otherwise being not able to play, a *Freeze* mechanism was implemented. To prevent users freezing their avatars on a regular basis, certain penalties for using it were added.



## Politics and Society

The central political unit is the *Union*. A union can be compared to a state and is bound to a planet. So one planet can contain only one union. There are five predefined areas that must be administrated in a union:

### *1. Gates*

They are the connections to other planets. For each gate it is possible to control *Immigration* and *Emigration* for single persons or for all members of a certain union. It is possible to create *Visas* for certain persons, too. This allows to create united Planets similar to the European Union or the USA or to shut all borders for foreigners.

### *2. Union's Asset*

This is the asset of the union. It allows controlling the money of a state. It is possible to create new money on the union's asset, too. The creation of new money is limited: players can create only a certain amount of money in a certain period of time. Money cannot be destroyed.

### *3. Rulebook*

*Rules* are the laws of a union. They define the rules of the game on a planet. Every member of a Union can read the Rulebook. Changing the rulebook is reserved to the *Unionheads* (see Violence and Power).

### *4. Votes*

Unionheads can ask their citizens to take part in a Vote. A vote is open for a certain time. After closing a vote, all members of a union can look at the results.

### *5. Membership*

Unionheads can *invite* members of other unions into their own union. When the invited person agrees, she/he becomes a member of the new union. A person can only be member of one union at a given time.

Another organizational unit is the *Cluster*. Clusters are groups of interests of certain persons. A person can be a member of multiple clusters. Members of a cluster can be members of different unions. Clusters have the same administrative areas as the unions except gates. Clusters cannot create new money on their asset. In contrast to the unions, a person can leave a cluster without agreement of other members.

## Violence and Power



One of the main goals of *Myzel* is to allow the modeling of a wide variety of societies. The freely definable rules that can be changed by the players provide the base for this. The problematic aspects tend to show when persons don't follow the rules. A real society uses its monopoly on violence as a last consequence [10]. People who do not obey the rules are forced to by loss of freedom or sometimes even loss of their lifes. There is always some kind of police force to correct disregarding of the laws. For *Myzel* to become a playground for realistic societies it must implement some sort of violence, which can be used to execute institutional power. The main problem with violence is a phenomenon, which is quite common with Internet online games called Player Killing. Player Killers are persons who kill other player characters in an online game just for the fun of it. They do not care for the real objective of the game and just try to kill as much players as possible. In *Myzel* we tried to minimize the risk of Player Killing [5] by using a special mechanism called *Punching*, which makes the killing of other players a great risk to your own health. When a player *punches* another player the loser of this action is calculated randomly with a 50% chance. The player who loses has her/his health decreased. Short of dying all items a player carries in her/his inventory are dropped. This allows a police or robbers to confiscate all things a player carries without killing a player.

Similar to violence the distribution of power is very important factor in a system. In the real world power is an abstract element that consists of a variety of components. Two of the most important are the ability to use force and the ability to speak or act for a large number of people. The ability to act for a large number of people poses a special problem on a system like *Myzel*. There must be some mechanism that allows flat hierarchies as well as dictatorial regimes to control *Myzel*'s interfaces to functions like emigration and immigration control at the gates. *Myzel* solves this with *Powertokens*. Certain actions that need to change *Myzel*'s parameters are regulated using powertokens. For each of these actions there is a threshold of powertokens needed to complete the action. Powertokens exist for each union and each cluster in a certain fixed amount. The tokens can be distributed among the members of a union or cluster. Members holding powertokens are called *Unionheads* or *Clusterheads*. Only one of the members who possess powertokens can initiate an action where tokens are needed. If the initiator does not possess enough tokens to fulfill the threshold, a *Powervote* is started. All members with the same type of token get the chance to vote. If enough members holding enough tokens vote "yes" in this vote, the action is

executed. The vote is open for a certain time. If the vote does not get enough "yes" votes or the time runs out, the action is cancelled. This powertoken mechanism allows dictatorships, where all tokens are in the hand of one player, as well as democratic processes, where elected representatives hold tokens.

## Economy



Initially *Myzel*'s economy contains two sectors that should be increased by emerging new ones. One sector provides the basic universal resource – energy – while the other one deals with information – another crucial resource of the information society.

### 1. Refineries

They make force contained in sources usable and distribute it via pipes. The operators of the refineries must connect their plants to the end user's converters with pipes, controlling the consumption by the pipe's thickness. It is possible to connect a pipe to another refinery to increase its output if its source is too small or empty. Pipes can transport force even across planetary boundaries. The refinery's operator defines the price for the force consumed. Consumers as well as operators see the amount of force consumed via a certain pipe.

Refineries and pipes have to be regularly repaired to keep them in good working condition.

### 2. Publishers

A publisher is a device comparable to a newspaper press. It is used to publish an electronic magazine called *eZine*. Like a paper magazine an eZine is published in issues that consist of *Articles*. Every player in *Myzel* can create articles and send them to publishers. These articles can be created with a tool called *Writer*. The author creates an article with a certain price tag and sends it to a publisher somewhere in the universe. If the article is printed, the author is automatically notified with a message. EZines are sold either as single issues or as subscriptions. All eZines are sold in the whole Universe.

When *Myzel* is started, all planets have an exchange rate of 1:1 for their currencies. The system regularly calculates inflation based on the prices of force and eZines. The inflation defines the value of the currencies and leads to exchange rate changes over time. To prevent big jumps in the inflation the prices of force and eZines can only be changed in small percentage steps. All transactions of money across borders of planets automatically respect the exchange rate. If a player changes union, her/his asset is automatically converted. Cluster assets always have the currency of the first union of the founding member, even when she/he changes union or leaves the cluster.

## REALIZATION

The proof of concept prototype was realized at the *Institut für Gestaltungs- und Wirkungsforschung* (Institute for Design & Assessment of Technology) at the *Vienna University of Technology*. Development started in August 2000. The first public version of the client was available for download in November 2000 from the website. This website featured the background [6] story for *Myzel*: a group of refugees had been on escape from their home planet ruled by a cruel and murderous dictatorship. Searching for new solar systems to colonize they had found two planets called *Hallimasch* and *Parasol*. In this plot the users of *Myzel* represent these settlers and we the developers were constantly improving the infrastructure for them.



The website also featured a forum and means to register as a new user. In the beginning a lot of information for the community was posted at the site. As soon as the necessary tools for communication were available in *Myzel* itself the importance of the site faded.

The final prototype ready for the test phase was finished in February 2001.

### Architecture

The current version of *Myzel* was intended as a proof of concept prototype and not as a professional product to be sold. Therefore the concept of the system is straight-forward and represents a normal client-server architecture: a central server responds to the requests of the client applications running at the user's computers. The server stores the definition of the virtual world with the state of all objects like avatars, buildings, messages, discussion boards etc. in a simple database. It is also responsible for the communication between the community members and the registration of new users. The simulation of energy and economics is done as a background task.

The prototype client program is available for download at *Myzel*'s website and is suited for computers running Windows, Mac OS, Linux and all other machines that can run Java 1.1. It is more or less a dumb graphical user interface to the server's functionality comparable to a web-browser. A client-side data cache was implemented to reduce the amount of traffic between the client and the server.

At the current state of development the client program's interface is far away from being user-friendly or state-of-the-art in present-day computer games. It simply displays the objects of the game world as text in lists and standard user interface controls and accepts input through buttons, checkboxes etc. The development of a new client that features 3D graphics in first or third-person view is planned for the next (and final) stage of the project.

The communication protocol that specifies the transfer of data between clients and server is a very simple one and far from being secure: both client and server send commands of the Python programming language to each

other to change the server's database or display results of commands at the client.

### Development

The system was developed with a rapid-prototyping and extreme-programming [13] inspired approach. It was our aim to create a working system at the very beginning of the development and then to enhance it further to full functionality. We started with a simple room oriented chat system and released new versions of the client and server software every week. We decided to add those features in the beginning that made communication and selforganization possible for the community. Discussion boards and messaging services were the first. Then we implemented tools for group management and creation of buildings and media. The last things we added were the complex simulation of energy and economy.



This way we had a working community at every stage of development. Our users commented the new features and made proposals for new or changes to existing ones.

To accomplish this flexibility we chose a set of highly dynamic tools. The core development was done with *Java* (client and server) and *Python* (the JPython or Jython implementation) was incorporated as a scripting language for both client and server. So we had been able to make a lot changes at server runtime or within only a short server downtime. The idea behind this was to save the state of the virtual world as long as we could to minimize the shock to the community that every respawn or reset of the world caused.

Because of this close interaction with the development community the core parts of the system proofed to be very stable. We had a few severe problems regarding stability of the system that could be solved at the end of the beta testing stage. The security problems and issues connected with cheating players could not be fully straightened out as a solution would have required a major redesign of the client-server protocol. A commercial version of *Myzel* would of course require a new implementation of this module.

## RESULTS

### Testing

The proof of concept prototype was tested in three controlled and in one free scenario (public access). The controlled scenarios were at a high school in Vienna, in a course at the University of Klagenfurt and in a class of the Teachers Education Center in Vienna. The public access test started when the first beta version of the prototype was ready. It continued during the whole development period until the end of the proof of concept testing. The tests in controlled scenarios started with the first fully functional proof of concept prototype.

The goal of the three controlled scenarios was to test the educational possibilities of *Myzel*. The free scenario during the development phase should help to build a core community for the further realization of the game.

None of the test scenarios were isolated. All four scenarios were placed in the same universe and connected to each other. The high school class and the university course started on their own planet. These players were born on their special planets. All other scenarios were based on the original idea of random birth on one of the two "open" planets in the universe. This is the reason why strong interaction between the scenarios existed. All players were informed about all the other scenarios.



The testing was done to show the possibilities of *Myzel* for education and for creating a large game community. Furthermore the tests should help the development team to find weaknesses in the game's concept.

The test phase started in January 2001 and ended in May 2001.

## Community

Approximately 1,000 registrations for *Myzel* were issued during the whole test phase. But many players registered more than one avatar. The active community consisted of 150 players. The core community consisted of around 50 players. Only very few players were active over the whole test phase. Most players in the game were active for about two to eight weeks. During its peak time *Myzel* had around 30 active players.

The difference between registrations and real players has two reasons. First, some players generated avatars to get game money. So they logged in only once to transfer the start money of the avatar to the Asset of the main playing avatar. Second, one player tried to get rich using an automated script for registration and transfer of the start money.

Nonetheless the community was large and active enough for a useful evaluation of *Myzel*.

## Genesis of a Game World

The development team created two planets for the free test scenario: *Parasol* and *Hallimasch*. The school scenario had its own planet *Baernoul* and the university scenario also had its own planet *Minimundia*.

At the end of January the full functionality of the game was finished. The evolution of the system took the following steps:

At the end of January the universe consisted of Hallimasch, Parasol and the *Starship Myzel*. The starship was the home of the developers only. Each of them had an avatar with their real name and for tutoring the *Captain* avatar existed. If a player had problems, she/he was able to contact the Captain for help. The Captain existed since the beginning of the project and brought the backstory into the game. He also had an eZine to keep the community informed about bug fixes or the status of the project.

After three weeks the planet Bearnoul and Minimundia went online.

We created a basic Rulebook as a starting point. It regulated the distribution of the powertokens, number and responsibility of the unionheads, the rules for changing rules and the prohibition of murder. It made no suggestion for the punishment if someone had broken the rules.

On Hallimasch and Parasol three unionheads (for rulebook, asset and gates) existed. The powertokens were divided in a 8 : 8 : 7 ratio. Each union had 300,000 credits. If a new player was born on a planet she/he got 200 credits as start money.



At first the players built three refineries. So they could eat and build all other necessary things. Soon after a publisher was built. This publisher's eZine created an almost complete documentation of the game's history. Three weeks later the next publisher was created. These refineries and publishers provided the supply of the community for seven weeks. After this time another publisher and refinery were built. But some players owned refineries for their own consumption and never sold force. Near the end of the test phase three more active publishers were built. One of them was a police publisher. In its eZine the players could read stories about crimes and criminals in the universe.

The political evolution began with the introduction of start money of 1,000 credits for new players on Parasol. On this planet you also could find a "social asylum". This was a building with a converter in it and a key next to it. Unionmembers were invited to eat from this converter and the union paid the bill for the consumption. The fact that some players stole the key became a problem for the economy, because the refineries had only a very small crowd of paying customers.

On Hallimasch two out of three unionheads left the game. The rulebook contained no rule for this situation and the unionmembers discussed the proceeding. The result was a new vote for all three unionheads. The new unionheads saw no need for social measures for their members like the unionheads on Parasol.

An important event for the society evolution was the first murder in the game that took place after ten days. Nobody knew the killer. All eZines talked about the crime and the community discussed the installation of a police force.

A few days later someone made an attack on a unionhead of Parasol. She survived but lost all items in her inventory. The offender later claimed it was a mistake and gave her inventory items back. Since that time the violence became an important topic in *Myzel*. About this time a police force and a court, called tribunal, was added to the rulebook of Hallimasch.

Refineries and publishers provide the base of the economy. Operators of these facilities should employ and give salary to other players. Most publishers had writers. They were paid on basis of submitted articles. The refineries had no employees.

Some players tried alternative ways to the existing economic areas. They started banks, unions, life assurances, marketing companies, fortune games, museums and blackmailing organizations. Most of these companies

were clusters without any rules in the rulebook and were not very successful. All players who started new companies had refineries or publishers for their financial backup.

### Feedback and Problems

Feedback from all test scenarios was collected. The high school pupils had to write reports, the students of the Teachers Education Center Vienna had to fill out questionnaires and the students of the University of Klagenfurt met in a feedback round at the end of the course. We interviewed several students at the Teachers Education Center and several pupils, too. Furthermore we got a lot of direct feedback while being online.



Major problems were found in the implementation of violence and the possibility for players to have multiple avatars in the game. Some players registered up to 50 avatars. They transferred the start money to their main playing avatar and collected a lot of start capital this way. Some of the refineries and publishers were founded this way. This interfered with the evolution of the economy.

The implementation of violence should make player killing impossible or boring. The low number of killings showed that this concept worked. On the down side this made the implementation of institutional violence like police forces very difficult. The evolution of the game showed the necessity of this kind of violence.

The user interface was one of the most criticized issues. Almost all players wanted beautiful graphics for the world and nice looking control panels. The straightforward looking interface was one of the reasons for the small number of players in relation to the registrations. Unfortunately, we did not have enough resources for the PoC to make a better interface.

Another problem that has to be blamed on the small resources was community care. For successful running of a game community, regular events, new backstories and availability of the developers are important. If the community feels stagnation in the development players will start to leave the game [6].

Even though there were problems, players gave strong positive feedback. Many players liked the idea to create the rules themselves. They found developing a virtual society interesting and liked the low violence level in the game. Last but not least they had much fun playing *Myzel*.

## CONCLUSION

Most players liked the four basic features of *Myzel*: rules, energy, information and groups of interests. The areas information and energy contributed much to the gameplay. The community created organizations comparable to real companies. These clusters and their founders had much influence throughout the game evolution. Refineries and publishers were in many cases organized

as clusters. So the idea of organizational units acting like macro-actors was realized in this part of *Myzel*.

Information as product for trading was not accepted well. One reason for the slow evolution of information trading could be that the players had other preferences. Some of them did not like writing articles to earn money but found no alternative roles in the game. The community seemed to be too small for creating new low-level roles. This led to problems for the publishers because they could not find enough journalists for their publications.



The definition of game rules by the players themselves was believed to be a very interesting idea but it proved to be very difficult to take measures against players who did not obey the rules. The implementation of violence in *Myzel* prevented the creation of better virtual society systems. Another problem was the small set of rules in the rulebook at the beginning of the game. Many players didn't bring enough skills and knowledge with them to build up a legal framework for a society.

Lower acceptance inside the game found selforganization in macro-actor groups [7]. Beside refineries and publishers only a few clusters existed. A reason for this was the small number of active community members. Players discussed their problems face to face. Even most problems on union level were solved in direct communication. Only issues with long term effects were written down in the rulebooks. In this case unions, refineries and publishers acted as macro-actors.

All in all the Proof of Concept has shown the possibilities of games like *Myzel*: *Myzel* started a community of players without marketing measures. Despite the lack of a graphic interface *Myzel* held this community for almost half a year. In the short testing phase the players saw interesting evolutions of different parts of society. With a few improvements of the concept and a state-of-the-art graphical interface *Myzel* should be able to hold a large community and create a virtual society of its own.

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