# From Chit-Chat to Formalized Documents

- A Design Study of the Communication in a Persistent Multi-player Computer Game

20points Master Thesis
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# Abstract

In this Master thesis the key discussion is how to make dynamic informal conversations comprehensible to a computer system. The discussion is at large centered towards the distributed persistent real-time multi-player computer game Worlds.

In this thesis we discuss the important aspects of communication and collaboration in computer games, and how these affect the the formalization of communicated information into computable data.

The discussion of this thesis is based on several kinds of sources; empirical studies of games, discussions with players of multi-player computer games, meetings with a game designer and a game programmer and forum activities on a message board for independent game developers. Beside this the use of academic literature and the design of an actual computer game, are also brought together to create a platform for thought and discussion. This thesis is an attempt to bring reflection and analysis into the craft of computer game making, as well as to bring aspects of game design into the world of academics.

The result of this thesis leads to a design suggestion of the communication and agreement creation system of the game Worlds. We find our discussion and our design, interesting and important, as an object for further analysis, discussions and thoughts.

**Keywords:** Design, Game Design, Communication, Collaboration, Iconicity, Flexibility, Formalization, Informal, Formal, Computer Games, Distribution.

# How to read this Thesis

This thesis is mainly written, apart from for ourself, for people that have an interest in computer games and computer game design. Although, we find that its contents may be interesting to other aspects of design. Therefore we have, in this thesis, created chapters of great width. To give you, the reader, the possibility to choose which parts are of interest for you, we present this detailed table of contents. The purpose of this is to support you, thus making your reading experience more comfortable.

We recommend that you read this thesis with caution. We have not brought up every aspects of the area discussed and sometimes it's up to you as the reader, to make your own assumptions. This thesis is also divided into three larger parts (as described below). The separate parts brings up different kinds of information important for this thesis. It is recommended, when finishing a part, to take a break in the reading and reflect on the parts content and importance.

## Part 1 – Introduction

The goal with this introducing part is to give you, the reader, a insight into this thesis, our background and relation to the subject discussed. We present the thesis's focus and the sources of information used to support it's discussion. We also try to describe the context of our work.

### Introduction

These chapters are importance as we try to frame the question of this thesis, and give a background and a context to what our work has been about.

### Sources of Information

Here we describe the different sources of information used in this thesis. To get a notion of, from what base we have made our assumption, it's recommended reading.

### Scenario

This chapter is supposed to create an understanding of the game, our work and our assumptions that have been applied to the game design.

### Technical Description

The technical description is to create an understanding of the game data storage. This chapter has, as it's heading implies, a more technical focus.

### The Design Process

This chapter shows our work process. It shows the different parts of our

design, but it also brings forward some of our thoughts on software design.

## Part 2 – The Empirical Study

The goal with this part is to present the empirical materials used in the thesis. All data presented concerns the subject discussed in the thesis, but are not always directly used in the analysis. It is important reading though, to be able to understand our view of the design process and how our assumptions in the analysis are made, thus to fully understand our design.

### Introduction to the Empirical Study

As the name implies this chapter gives an introduction to our empirical study.

### Study of Games

In this chapter we analyze the two games Civilization 3 and Risk. These games are looked upon from our thesis focus. If you already are familiar with these games this chapter is no necessary reading.

### Focus Group Discussions

This chapter gives a summary of our focus group discussion. The chapter is mainly composed by quotations of participants. The focus group discussion concerns mainly the notion of communication in multi-player games and the flow of information.

### On-Line Discussion Forum

Composed as the above, this chapter contains many design aspects, as it's participants consists of both designers and players. The main focus concerns the flow of information.

### Workshop

The workshop is built as the previous chapter in this part. The workshop summary presents aspects of formalizing data to the game engine.

## Part 3 – Discourse

The goal with this part is to analyze the data collected in our work and reflect on how we believe it affects the design of multi-player computer games. We begin by establishing a theory, which is later used in our design.

### Agreement Creation in Computer Games

This chapter brings the empirical part together with the academic reading. We create a theoretical platform, used in the discussion of this thesis's focus.

### Design of Agreement creation in Worlds

This chapter shows our solution to the problems earlier discussed as a concrete design. We also explain our design using the theory established in the previous chapter.

### Summary

We end this thesis by summing up the important notions and their usage in the design of multi-player computer games. We also make a final stand about or work process.

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# Part I
# Introduction

# Introduction

*<Sir Baal> Gaarm: I need to pass through your lands with an army.*

*<Gaarm> Sir Baal: huh why?*

*<Sir Baal> Gaarm: I must attack the filthy and arrogant Lord Melkor.*

*<Gaarm> Sir Baal: hmm, I don't know.*

*<Gaarm> Sir Baal: That would put me in the between of two countries at war.*

*<Sir Baal> Gaarm: I respect that and therefore want to offer you 200 pieces of gold as a token of my gratitude, if you would let me pass.*

*<Gaarm> Sir Baal: hmm, I'm not in need of gold. What I really need is more room for my ever growing people.*

*<Gaarm> Sir Baal: If you give me your southwestern unpopulated wastelands I would gladly let any of your armies pass through my lands.*

*<Sir Baal> Gaarm: So you say, that is easily worth a lot more than 200 pieces of gold.*

*<Gaarm> Sir Baal: Is there anything I could give in return, I believe you will need a lot of iron to wage a war against Lord Melkor.*

*<Gaarm> Sir Baal: What if I gave you the opportunity to buy all iron from my mines before I put it on the market.*

*<Sir Baal> Gaarm: Will you accept offers below the market value?*

*<Gaarm> Sir Baal: One thing you maybe don't know is that Lord Melkor is the largest buyer of my iron.*

*<Sir Baal> Gaarm: Really, that sounds interesting. But what about me getting a price cut, I can't afford both the war and buying all your iron.*

*<Gaarm> Sir Baal: What about you pay half now and half when the war is over?*

*<Sir Baal> Gaarm: That would be great! So you let me pass through your lands at any time if I give you the southwestern wastelands and above that you will let me buy all your iron as long as the war continues.*

*<Gaarm> Sir Baal: Yeah, and for the iron you will pay half now and half when the war is over.*

*<Gaarm> Sir Baal: Sounds like a deal to me!*

*<Sir Baal> Gaarm: Great! I will send a messenger with a contract to you!*

The text above is an excerpt from a chat between two players of the computer strategy game Worlds. Their conversation, conducted in a text based real-time chat, has the shape of a negotiation leading to an agreement. The agreement isn't known to the game yet though, hence Sir Baals last line. For their informal agreement to be valid within the game it must be formalized into a contract and thus computable.

The focus of this thesis is the transformation from chit-chat to formalized documents and is intended for an audience that have an interest in game design.

As means to study the transformation a wide array of artifacts have been used. The basis for the thesis is (besides from written material in the field of study) discussions with designers and users of computer games and an actual design of a computer game. The design of a computer game resulted in the game Worlds, which has been a vital part of almost all our work in this thesis. The design of Worlds has given us an empirical foundation to build this thesis on.

The practical experiences of playing and/or designing computer games both we and many researchers and game designers sees as crucial for serious research in the field. Espen Aarseth[1] notes a danger in studying the computer games field without this experience. The lack of play and/or design experience among some researchers studying computer games has, according to Aarseth, lead to a lot of computer games research being performed from the premises of other fields of study, such as literature and movies, but computer games are not literature or movies and should be treated as an independent field of study[2].


## About us

The authors of this thesis are Fredrik Gustavsson and Daniel Lyrstedt. This text is the product of the Master Thesis we carried through the spring of 2002. During that period we attended the MDA (Humans Computers and Work-practice)[3] Masters program at Blekinge Institute of Technology (BIT)[4].

The MDA study program is a cross disciplinary education that strives

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1   Aarseth is researcher who has written the, in the computer games field, important book Cybertext – Perspective on Ergodic Literature, which also was his doctoral thesis. The book discusses how written text is affected by the medium it is presented with. Aarseth works at the University of Bergen (the faculty for humanistics informatics and art) in Norway where he lectures and takes part in different research projects. Aarseth is one of the founders of the academic computer games magazine Ludica. http://www.hf.uib.no/hi/espen/default.html

2   Aarseth 1997:14

3   http://mda.bth.se/

4   http://www.bth.se/english

for creating a new discipline of software designers rooted in both software engineering and work science. One part of the study program is focused on creating an understanding of how software should be shaped to fit a specific work setting's social structures and another part is focused on understanding the technical limitations in software development. The study program gives 50% work science[5] and 50% computer science[6] related courses. The MDA study program may, if desired by the student, be followed up by a Masters year. The purpose of the Masters year is to give the student experience in research related matters and to sum up all recent years at the MDA study program in an unique MDA-approach.

Both of us belong to the generation of people born in the 1970s that grew up during the dynamic era of home computers in the middle and end of the 1980s and therefore are more or less raised by different forms of computer games. Commodore 64/128[7], Spectrum 48[8], Nintendo Entertainment System[9], Sega Master System and Amiga 500 are all computer game platforms that have brought us up and thus created the interest we today have for computer games. In more recent years our interest for computer games, apart from playing them, also have included game programming[10], game design and game research[11], which is the reason for us choosing the chosen focus of this thesis.

## What is Worlds

The focus of this thesis, the design of the transformation from chit-chat to formalized document, emerged during the design process of the persistent multi-player computer game Worlds, a project by our game development team EnOrmous Games[12]. The Worlds project started during the winter of 2001 and has since then continued through the spring of 2002 as a part of this thesis.

One of the key features of Worlds was to build a computer game centered towards human communication and collaboration. The game gives the player a framework of resources and, put into a scenario, lets the players negotiate with each other, forming agreements, truces, alliances etc.

Apart from the above, another central feature of Worlds was that the game should be a distributed persistent[13] real-time game. Our definition of a

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5   http://www.iam.bth.se/
6   http://www.ipd.bth.se/?lang=en
7   http://www.cbm64.de/history.html
8   http://www.nvg.ntnu.no/sinclair/spectrum.htm
9   http://www.nintendoland.com/home2.htm?nes/history.htm
10  http://www.enormousgames.com
11  Gustavsson, Lyrstedt, 2001
12  http://www.enormousgames.com/
13  Frank Anders, 2000:11

distributed persistent real-time game is a game that match a certain set of rules, as follows:

- (*Distribution*) The game allows interaction with players through several kinds of clients.
- (*Distribution*) Game world data is stored on a server or by a distribution model.
- (*Persistent*) The game does not lose its game world status when the player shuts down his/her client.
- (*Real-time*) The game runs regardless of the player's participation.
- (*Real-time*) The game runs in real-time mode (not turned-based).

The concept of Worlds is that the game runs for a longer period of time, (several days, weeks or years), and that the game is played in real-time. That is, even if the a players is not currently "playing" the game at the time, the game still can change. Because of this the game uses the notion of distribution. One can play or be reached by the game by different kinds of clients. Thereby a player can have constant awareness of the game, and be notified when the game changes. On a buss trip to school, a mobile game client could be used, for instance a laptop or a Personal Data Assistant (PDA). In the grocery store a mobile phone client could be seen as an alternative, because of it's mobility and size. At work or on a coffee breaks, when a limited amount of time could be set aside for play, a standard Personal Computer (PC), with a web or a mail client might be used.

The game-play of Worlds mainly concerns establishing alliances, pacts and treaties with other players, making Worlds a very social game. The communication between players is the most important aspect of the game and therefore has to be appealing and dynamic. Due to this, communication in Worlds works on two levels, a formal and an informal level. On the informal level the players use what ever communication facility they want, face to face, text chat, e-mail, instant messaging, phone calls, video conference and so on. Communication on the formal level on the other hand is structured in a certain way to make it computable to the game engine. All alliances, pacts and treaties must sooner or later be formulated on the formal level to affect the game engine awareness of the game world's situation.

## Framing of the Question

The problem we came upon during the design process of Worlds, which this thesis is about, is how to enable agreements between human players made on a informal level, i.e. through real life conversations, text based chats or phone calls, comprehensible and thus computable to the computer game

system. We therefore formulated the question for this thesis as follows:

> How to make dynamic informal conversations comprehensible by a computer system such as the distributed persistent computer game of Worlds?

We think that the question of this thesis could be applied in several design situations when one is engaged in the process of transmitting informal talk to a computer based application. In this thesis though we are mainly focusing our theories on the computer application of Worlds.

# Sources of Information

Our work is based on different kinds of sources of information. In this chapter we will discuss our use of them, why they are needed in this thesis and how we have structured them to fit this context. The sources of information we have used is literature, workshop, design meeting, on-line forum discussion, game study and the design of an computer game.

All field studies have been performed from an ethnographic view point[14]. We see the information used as a "post hoc" representation, an account of what has been seen, heard and found "in the field". Writing this thesis is not just "writing up" the field notes, as the data collected has been interpreted and analyzed when used for this thesis.


## Literature

Literature as a source of information creates the theoretical platform on which this thesis is based. In this thesis the literature source of information consists of books, papers and text from World Wide Web (WWW).

Parts of this thesis uses materials written on a academical level, mainly from the areas of Computer Science, Human Computer Interaction (HCI) and Computer Supported Cooperative Work (CSCW), while others (not academical) are brought in from the game industry. The later texts often focuses on concrete game design (design proposals, method proposals) or reflections of projects carried out (Postmortems). Although different in nature both the academical and non academical materials have been useful and needed to create an understanding and theory of the subject discussed.


## Workshop

One important part of our design process have been to collect several viewpoints and perspectives of our work. One of our design methods to achieve this has been to arrange player workshops. During the project we have arranged one workshop with users of on-line multi-player games, in which we have discussed the notion of persistent on-line multi-player gaming and how to get from chit chat to formalized documents. The workshop has been valuable in giving us feedback of our work, greater insight in the area of on-line multi-player games and several ideas and suggestion to our project.

The workshop have been audio recorded. The recording of the workshop has enabled us to, in greater means, focusing on the workshop's discussions, instead of focusing on logging the workshop's events ourself.

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14 Anderson, 1996:6

The recordings have been transcribed from it's original medias to text based transcriptions and summaries.


## Focus Group Discussions

The notion of focus group discussions is a sociological method to create an understanding of a specific subject. What differs the focus group discussions from ordinary interviews and discussions is that it's the focus group have a discussion between themselfs about the given subject, instead of answering questions given by an interviewer[15]. In this project we have put together one focus group discussion with users of multi-player games to get their opinion of our project and it's problems.

The focus discussion group consisted of three players discussing our project from their point of view. We were not part of the discussion, instead we acted as moderators, providing the group with concrete answers about our work, showing prototypes and making sure that the discussion concerned the discussion's subject.

The advantage of the focus group discussion method over the other methods used, has been that when not giving the discussion group specific questions and not participated in a greater means, we believe we have not affected the discussion and the result of the discussion, to that degree, as ordinary interviews or ethnographic sessions might do. Also, we have achieved a broad discussion, with question raised from the discussion group, that was not in our thoughts before and would therefore not have been brought up if we ourself had been interviewers instead of moderators.

Like the workshop, the focus discussion where audio recorded and transcribed for further analysis.


## Design Meetings with Game Developers

During the course of this project we have had the opportunity to attend four design meetings with a professional game designer and a former game programmer. The design meetings have each been about two hours long and have focused on our project and our work process. As preparation to each meeting we have constructed several subject for discussion.

The design meetings have, as the player workshops, given us great feedback, ideas and advice, to our work. The design meetings differs from the workshops, as they have focused more on the design and the technical solutions of our project.

An important note regarding the design meetings is that, since the meetings have been present throughout the entire design process, they have a general view on our design. The subject of this thesis hasn't. The

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15 Wibeck, 2000

communication aspect of the game has been in discussion during every meeting, but only once as the single target of the discussion. The design meetings have not been recored and transcribed as the workshop and the focus group discussion. Instead the comments and suggestions from these meetings have often been direct incorporated into our game design.

## On – Line Forum

Throughout the project we have participated in extensive discussions at an on-line forum for independent game developers and computer game players.

The forum has provided our project with viewpoints emerging from a discussion between both players and designers. We have used the forum both as a source of information and as a discussion board discussing our own design situation. That is we have created our own discussion threads focusing on our project and searched through archives of ended discussions for similar topics.

## Game Study

During the years we have played hundreds of computer games and table top games. The many nostalgic memories from these games does not from our academic point of view fit as reference material. In this project we have therefore made an analysis of a couple of games, both a computer game and a table top game, to get a more academic view on how these games concern our thesis focus. The games we played in the mid-eighties and forward has of course been important for this thesis, as through them, we have developed an ability to judge games and see different design archetypes that are used to create a game understandable by the player.

## Design of Game

Bound to this thesis is the design project of the multi-player computer game Worlds. Without the Worlds project, the question of our thesis would probably not have been raised in the first place.

Designing the game while developing a theory for this thesis have given us the possibilities to test and elaborate our ideas. It has also been crucial in our design discussion, our workshops and our design meetings as we have been showing concrete scenarios and real user settings, bringing our thesis to a context. As the work with the Worlds project has continued it has given us new perspectives and viewpoints to our thesis. Our view is that the design of computer applications (in this case game) is an important and vital ingredient when attending to research in the areas of computer science.

# Scenario

To give you, the reader, a wider understanding of the problem area discussed in this thesis we will, in this chapter, describe a scenario of a session of Worlds, the computer game of which a great part of this thesis is based upon. The scenario will be presented through the eyes of an imaginary player, let's call her Jenifer, of the game.

## Joining the Game

Jenifer decides for some reason to test the game Worlds. As opposed to other games she have bought through the years this one doesn't come in a box with a printed manual and a Compact Disc (CD) containing the game. Instead she enters the games web-page and applies for a test account. In the test account creation process she gets a login and a password, that is valid for one week, which will give her full access to the game during this period. If she after that week feels that the game is entertaining she may begin to pay a monthly fee to get access to the game Worlds.

When the registration procedure is over Jenifer decides to join a beginners game of Worlds. She starts a game client and is prompted to enter her user name and password. The entered user name and password is verified and Jenifer enters the lobby part of Worlds.

Worlds uses a lobby system in which the player is supposed to find an interesting game to join. When Jenifer enters the game lobby she automatically joins a text based real-time chat such as Internet Relay Chat (IRC)[16]. Here the users of the lobby may discuss all kinds of matters, since Jenifer is a beginner of the game Worlds she asks some questions about the game and gets a recommendation for a good introduction game scenario.

*Illustration 1 The Login Screen*

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16 http://www.mirc.co.uk/ircintro.html
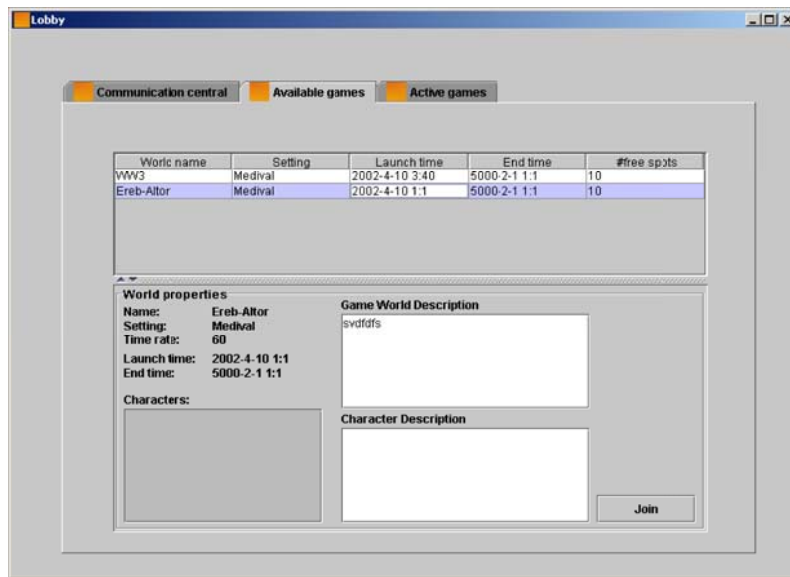
*Illustration 2 Overview of the Game Lobby*

Besides the text chat the lobby contains a view for joining new games and another view for administrating already joined games.

Jenifer proceeds to the "join a game" view, this view provides a list of all joinable game worlds along with some basic information about them (to give some guidance to the players decision). Jenifer browses through the characters of the, in the chat, recommended scenario and finally decides upon one. She joins the game as Sir Baal the lord of the western county. The scenario describes a setting where the king, of the only country, of the scenario is old and sick. Rumors tell that the king will soon die, maybe he already has. Sir Baal has the objective to take over the king's throne when he has died.



*Illustration 3 The Chat in the Lobby*

When Jenifer has clicked on the join button she goes on to the "administrate already joined games" view. Here she gets a list of all games she currently has joined, in this case the "king will soon die" scenario she one moment earlier joined, is the only available in the list.

When Jenifer joins the game she enters a desktop resembling environment. The Graphical User Interface (GUI), consists of different

artifacts lying around on the desktop, such as a magnifier glass, an old map, a candle and a stamper.

## Playing the Game

Jenifer takes some time to brief herself on the game world's current state of affairs. With the map she gets an overview of the game world's geography, with the mirror she gets information about her character and with the notebook she gets an overview of her relationships with other game characters.

The computer game Worlds is relationships centric, which means that a



*Illustration 4 The full screen PC client shows the Mirror, the Map, the Candle, the Notebook, the Magnifier glass and the Stamper.*

large part of the game is about establishing and maintaining a good relation with key characters in the game. In the scenario Jenifer plays, besides her, there are two other lords and four generals, that all aspire for the throne. It would be impossible for her alone to claim the throne. Instead she must collaborate with other characters and maybe betray them later on, to successfully become ruler of the country.

### Negotiation

Jenifer decides that she needs some armed forces to back her up in the emerging struggle for the throne. She therefore reads some public information about the four generals and decides upon which one of them to contact. Jenifer now enters a negotiation phase with the purpose to create an agreement between herself and the general Braalk. She contacts Braalk through the in-game real-time text chat. After a lengthy discussion Braalk tells Jenifer that he must check some things before he can give her an answer, and promises to contact her later that day.

While waiting for Braalk's answer it strikes Jenifer that she had promised to meet a friend at the café. She grabs her mobile-phone and leaves. At the café time flies by. Suddenly Jenifer gets an Short Message Service (SMS). It's from Braalk and says the following: "I agree to join your cause and will gladly see you as the king of the country. But I have

one condition. You must supply me with enough equipment and people for an one thousand men strong army!".

This demand creates a problem for Jenifer. The people of her land isn't under her absolute command.

Worlds divides the people of the countries into different computer controlled population groups. Each population group's actions is determined by an Artificial Intelligence (AI) routine, which can be given different kinds of "personalities". If Jenifer wants to agree upon Braalk's demands she must convince at least one of the population groups of her county to allow Braalk to conscript troops from them. To determine the population group's actions the AI-routine takes in account how strong the population group's relationship is with the parts involved in the agreement, what has been proposed (what may they gain or lose), a random seed and the population group's "personality".

Jenifer decides that she wants to agree on Braalk's terms, and therefore must convince her population that this is a good thing. As Jenifer currently is situated at a café she enters World's Wireless Application Protocol-page (WAP), where she accesses information about the population groups of her county, to find out which of them may accept the conscription deal with Braalk. She finds out that the population group Men of The Great Mountain, to which she has a strong relationship, is the population group that is most likely to agree upon Braalk's proposal.



*Illustration 5 A slide show of Jenifer's navigation through the WAP pages(Should be read from left to right).*

Since the WAP client doesn't support the option to negotiate with the computer controlled population group, Jenifer sends a reply to Lord Braalk's SMS that she agrees to his terms and that she will have a signed agreement available as soon as possible.

Next door to the café is a library which has a couple of computers connected to the Internet. On her way home Jenifer borrows a library computer and visits the game Worlds homepage.
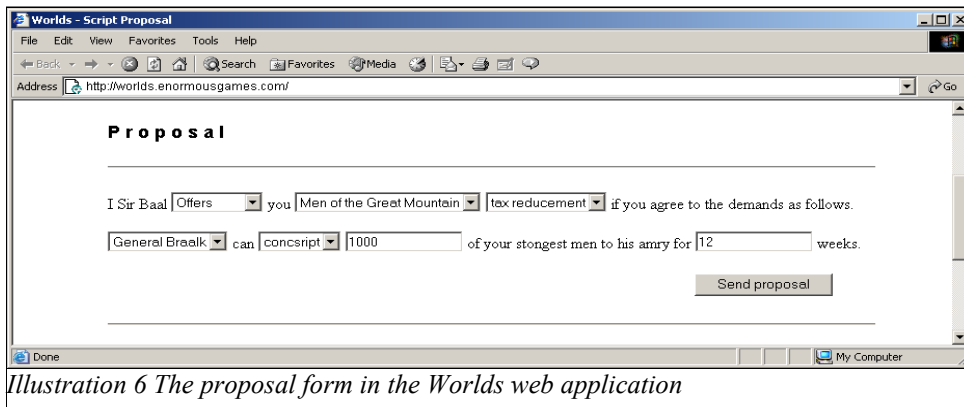
*Illustration 6 The proposal form in the Worlds web application*

At the homepage she is able to send an agreement proposal to the population group the Men of the Great Mountain. The proposal is created using a web form, thus making it less advanced and flexible then the PC-client she uses at home.

A proposal won't be answered directly, this to simulate that it takes some time to deliver the proposal to the right persons. Taking this in notion Jenifer figures she will get a reply by the time she gets back home.

The first thing Jenifer does when she gets home is to log on to Worlds with here PC. She is met by good news as the population group the Men of the Great Mountain has accepted her proposal. She contacts general Braalk on the real-time text chat and after a brief discussion they decide that Jenifer is to create and send a proposal to general Braalk.



Jenifer writes the proposal and sends it to general Braalk. By accepting to the terms of the proposal a relationship will be constructed between the two parts. A few minutes later Jenifer receives an acceptance from general Braalk. To verify this Jenifer looks in the relationship table and can confirm that a relationship now has been registered to the game.

Backed-up by an army such as general Braalk's Jenifer has become a strong player in the upcoming battle for the throne.

*Illustration 7 Proposal for relationship between Sir Baal and general Braalk*

# Technical Description

In this chapter we will describe the implementation we did as a part of this thesis. The description will focus on the parts of the implementation that is relevant for the topic of this thesis.

## Software Design Overview

The game Worlds does not consist of one application only. Neither does it use the traditional software model of multi-player games, consisting of one server which all the players connect to with their client. One of the key features of the game is to provide the players with tools that let them interact with the game at any point, regardless of their current whereabouts.
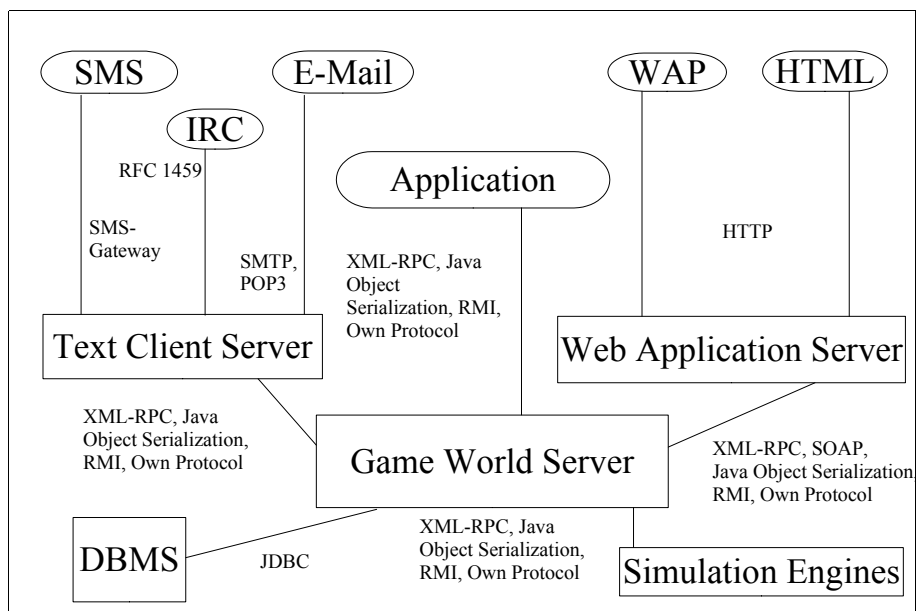


*Illustration 8 Model of the Client/Server structure of Worlds*

To attain support for this kind of distribution we have created a web of servers, with different tasks assigned to them, which acts as proxies or translators between the different kinds of game clients and the actual game server.

## Server Distribution

Currently our design includes four kinds of servers, the Game World Server, the Text Client Server, the Web Application Server and the Simulation Engine.

The actual game information and game logic resides on the Game World Server, which make it the main server.

The Text Client Server plays the role of a proxy between the Game World Server and different kinds of text based clients. It simply parses incoming and outgoing messages, for example a message received from IRC might look something like this:

> :baal!jenifer@acomputer.somewhere.com  PRIVMSG  braalk  :attack  lord belthors domains or I'll stop letting you conscript troops from my people!

The message is interpreted by the Text Client Server, which decides what to do with it.

In the case of the web clients there is a similar reason (as for the text clients) for a proxy server, even though the web clients provides more complex interaction capabilities. The move towards web services by the industry and research community eases the effort to implement the Web Application Server though, since tools and patterns are created to aid the developer while creating a web service.

The last kind of server is the Simulation Engine. The purpose of this is twofold, to decrease the Central Processing Unit's (CPU) load on the Game World Server and to give the game engine the ability to use external data in the game world such as real weather station data to determine the weather in the game world.


## Network Communication and Protocols

All communication in the game is performed over a network. This makes the implementation process harder since, for example, data located on the Game World Server might be needed in a client. Some clients, such as E-mail and IRC, communicate through an already defined standard protocol, thus limiting the possibilities of communication for that client even more.

How come the implementation process becomes harder when implementing a distributed program then? When making a single program you have well defined tools, in the programming language you are using, that lets you share information within the program. When making a distributed application on the other hand there are no such tools. There simply is no standardized way of sharing data amongst all servers and clients of a distributed application.

The solution for communication over networks has and is to define a protocol, rules for how the data is to be sent and structured, which the clients and servers must follow. A protocol can be seen as containing two parts, data and meta data. In the design process we tested many kinds of protocols and ways of distributing data. Protocols such as Java Object Serialization, our own protocol, Extensive Markup Language – Remote

Procedure Call protocol(XML-RPC) and Simple Object Access Protocol (SOAP) have been tested. Since all our test implementations of servers and clients was made in Java we decided to use Java object serialization as means for communication between different clients and servers since it gave us the best speed of implementation and speed in use ratio.

## Communication and Agreements in the Game

From both a technical and game-play point of view the game Worlds is a relationship centric game. The player data structure contains one relationship entity (object) for every actual relationship with other characters in the game. A relationship is defined by a couple of variables, levelOfRelationship, levelOfTrust, levelOfHonesty, levelOfDependency, relator and typeOfRelationship. These variables determine how the game engine and the simulation engines, connected to it, will treat the relationship.

The relationship definition variables is, in the game, changed through the players actions and the establishing of agreements between players. Since we, in an early stage, found the agreement establishing to be the central part of the game's game-play we wanted that process to be as flexible as possible. Therefore we decided to let the negotiations between players take place completely outside the game engine. The idea was to make the negotiation process independent of the Game World Server implementation and only let it take part of the outcome of the negotiations. This does give the players the freedom to choose how the negotiation is to take place, they may make a phone call, meet at a café, chat on-line or have e-mail correspondence to name a few possible ways of negotiating.

The distributed nature of the game creates one problem though, how do you contact a player when he/she might be anywhere playing the game? We have decided to solve this problem by putting some communication through the Game World Server. Therefore we have created an in-game messaging facility that helps the players make the first contact and decide upon an other communication form if they desire. The players are able to configure a messaging profile telling the game engine where to send received game messages. The game message is sent similar to an e-mail to the Game World Server which in turn looks up the messaging settings for the receiving player and thus finds out how he/she is to be contacted.

## The Game Structure

Flexibility and ease of expansion has been important topics during our design of the game Worlds. Much work has been put into giving the very core, the game structure, of the game these traits. In the design of the game

structure we have had a lot of use of object oriented software design theories and object oriented design patterns. Our design relies heavily on object oriented concepts such as Inheritance[17], Encapsulation[18], Polymorphism[19] and Interface[20] and design patterns such as Singleton, Observer/Observable, Factory and Proxy.

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17 Inheritance -you define new templates and behavior based on existing templates to obtain code re-use and code organization .
18 Encapsulation - implements information hiding and modularity (abstraction)
19 Polymorphism - the same message sent to different objects results in behavior that's dependent on the nature of the object receiving the message
20 Interface - used to define a collection of method definitions and constant values

# The Design process

> Sometimes the designer is engaged in environment design, constructing skills and organizing those he think he will need. Sometimes the designer is engaged in artifact design, using the skills he has already constructed. [21]

As our work begun with the Worlds project and this thesis, we soon realized that to successfully accomplish the project ahead, we where forced to create an organized and well suited design environment for our work of both physical and abstract design tools[22]. We had to set up rules for our work, form a division of labor, create tools for scheduling our process, enable a visualization of a shared model[23] and building a theory[24].

At first we divided our work into six parts of design, design of game structure, design of software design tools, design of simulations, design of game worlds, design of game clients and design of thesis. The design-parts themselves have further been assigned to contain specific tasks to be accomplished.
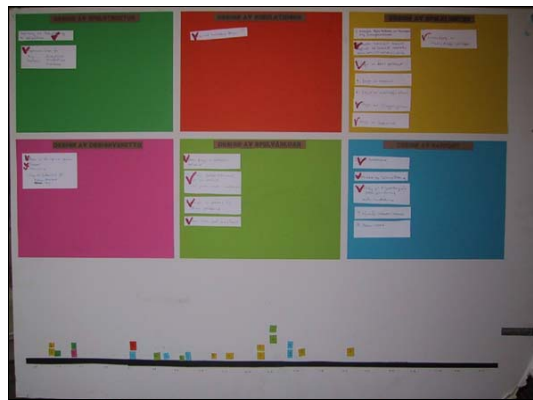


*Illustration 9 Schedule tool. The color pages represents the different design parts.*

The separation of our work into design parts has enabled us to focus ourself on the different parts of our design, although work in one area often influences the work in another. Our separation has foremost been to create an awareness of it's nature.

All the design parts above (excluding design of thesis) has included a software design process, containing notions of analysis, software design, implementation, evaluation and redesign,

What should be noted is that, by our definition, reflection and analysis is not separated from the actual design process and is not solely carried out after a project has ended. Reflection of this thesis's problems and design questions has been an integrated part of our design process, a cognitive artifact, to development, progress and quality assurance of our design. When a design session or task has ended we have together tried to explicate our work to each other making an evaluation of each others work. We have

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21  Kafai, Resnick, 1996:128
22  Gustavsson, Lyrstedt, Wessman, 2000
23  Senge 1990:205.
24  Naur, 1982

during our design had several design meetings with both game developers and players to get a perspective of our work and process. The above has in many cases led to redesign of both of the concrete software and that of our process.

## Game Structure

Much of the foundation of the design of the game lies in the design of the game's structure as it defines what information should be available to the game, that is what information the server should include. The game structure states what information can be available to the game's users, what concepts of abstraction the game should use and what relations the different concepts have to each other. It is also here we have defined all possible actions of the game, which later in the design of a client is made available to the players. Apart from this the design of the game structure has also included the design of the server's network communication.
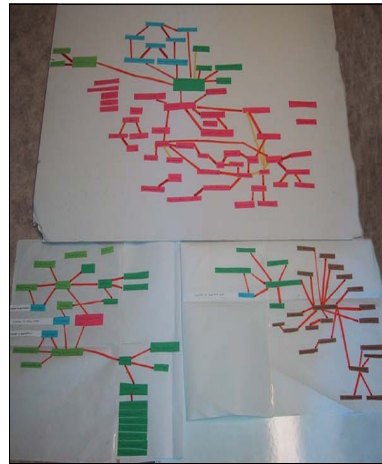


*Illustration 10 The game structure mock-up.*

One important artifact used in the creation of the game design has been our game structure mock-up. The mock-up is a physical class diagram, a large white cardboard with pieces of papers representing classes and their relationships. The papers are sticked on to the cardboard using adhesive.

The mock-up has enabled us to visualize our separate design solutions for a discussion and add them into the software design.

## Software Design Tools

An integral part of developing a good game is creating compelling content for that game. In order to create superior content, the design team will need to be equipped with well-designed, robust game creation tools. Therefore, by the transitive property, designing a good game is about designing good game creation tools.[25]

Our earlier experience, when designing software, has shown the great importance of design tools. To be able to manipulate your software and test your design in different situations and settings is an essential step in the

25 Rouse III, 2000

design process[26]. We therefore, at the beginning of the project, made the decision to spend great deal of effort in designing an overall design tool for the creation of game worlds and the ability to expose them to various conditions. The design of the design tools has run parallel to the design of the game structure as they are heavily connected. The design tool is the same tool that has been used to create the scenarios for the game Worlds.



*Illustration      11Design*
*editor:      Relationship*
*constructor*

*Illustration      12Design*
*editor:  Character creation*

*Illustration      13Design*
*editor:  World layout*

The design tool has except from being a primary artifact[27], a tool for building and testing games, also been an important part in our design meetings, group discussions and workshops where it has served both as a secondary[28] and tertiary tool[29]. As part of the discussion it has enabled us to communicate the concepts of Worlds (secondary tool) and as a springboard for new ideas and concepts to our project (tertiary tool). It has enabled us to, in a concrete way, show what information the game uses and how this information is structured. It has also given the participants an understanding to what extent it is possible expand the game information.

The work with the software design tool has often run parallel to the work with the game structure as one of the tool's main purposes is to create a game world, "filling it" with the information the structure has specified.


## Game Worlds

A game will not be particular interesting for the player without a setting for the game[30]. During the game world design this setting is created. Aided by a design client the designer fills a game world with information, the geography is created, countries are added, the background story set etc. In the end a game world is created.

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26  Gustavsson, Lyrstedt, Wessman. 2000
27  Bertelsen, 1998
28  Bertelsen, 1998
29  Bertelsen, 1998
30  Gustavsson, Lyrstedt. 2001

The game world design also includes adding characters to the game and balancing these characters against each other.



*Illustration 14 Definition of actions available to game characters for a specific game scenario.*

## Game Clients

The Worlds project strives to create a persistent real-time game that players should be able to play whenever desired. Our solution to do this has been to enable several interaction possibilities, that is, several game clients making the game distributed in it's nature.

After the design of the game structure and the design tool where finished we started working on the design of game clients. At the moment the PC client, which has become the main client of the game, is under development, as the SMS-, WAP- and Web clients.

During the design of the game clients we reached the conclusion that not all actions available to players in the game should be supported for each client. Instead we decided to design the clients task after it's interaction possibilities. The main client does support all the actions of the game. The SMS client is used as a notification system and for simple interaction. The WAP client's main function is to receive information and get an overview of the game world and the web client for overview and simpler interactions.

## Simulations

To create an living and exciting game world, the Worlds uses various kind of simulations that affects the different variables in use. The supply and demand of goods and resources is simulated by a supply and demand simulator. How the advances of a country is spread around the world and if the local town gossip reaches the local authority before the uprising of an riot, is simulated by an information flow simulator.

The current implementation of the game simulations has not touched this thesis's focus and is therefore not part of any discussions.

# Part II

# The Empirical Study

# Introduction to Empirical Study

This far in the thesis we have given you background information regarding the problem studied and our context the the work.

As you can see in our description of our sources of information we have used a lot of different kinds of sources to gather empirical material to base the analysis on. In this part we will present the relevant parts of this empirical material. The various kinds of sources of information has been separated into different chapters. The material presented in these chapters will create the foundation of the end discussion.

Note, the focus group discussion and the workshop where originally performed and transcribed in Swedish language. All quotes taken from these sessions have been translated by us for the use in this thesis.

# Study of Games

In this chapter we will describe our studies of some games. The studies are made as analytical study, of our selfs playing these games, or even more a study of the actual games. Our method of work has been to play the game, take notes and finally write a summary of the case study. Maybe it can be compared to a literature researcher analyzing a book or a movie researcher analyzing a movie.

The studies have focused on the creation of agreements in the game, how they are integrated in the game and what makes the solution good or bad? The following pages contains a summary of these studies. The studied games is the computer game Civilization 3 and the tabletop game Risk.

## Civilization 3

Civilization 3 is obviously the third part in the Civilization series. The Civilization series is the all-time most successful turn-based strategy game. The game simulates the course of humanity from 4000 B.C to 2x00 A.D and the player takes the role as one of 8-16 civilizations. The goal is to through culture, diplomacy, science, trade and/or military force become the most dominant civilization in history.



*Illustration 15 The Main Game View of Civilization 3*

### The Game Play

The game play consists of making decisions for the civilization the player is controlling. Important aspects is to choose what technology to research in, what to build in the cities and maintain a diplomatic relation with other civilizations.

We will here focus on the diplomacy part since the agreement creation is a part of this. The player establishes diplomatic relations with other civilizations by simply move a unit to that civilizations borders. To be able to conduct more advanced negotiations than simple peace treaties a embassy must be built in the other parts capital. When a diplomatic relationship is established with another civilization it is visualized on the Relationship Map (Illustration 16). The Relationship Map consists of a circle, with a picture of the leader, for every

civilization the player has a relationship with. Between the circles are lines with different colors drawn, each color symbolizes the status of the relationship between the two parts. Civilization 3 supports war, peace, right of passage and military alliance relationships.
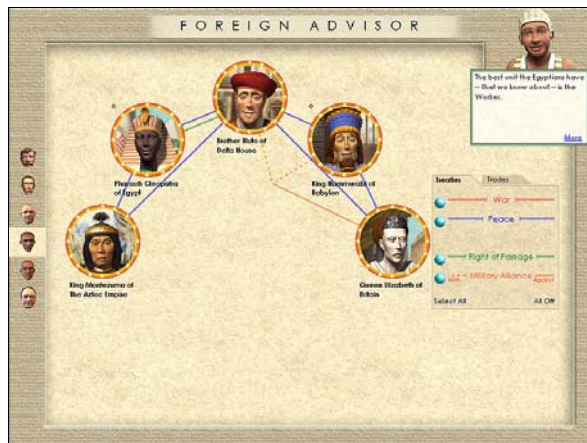


*Illustration 16 The Relationship Map of Civilization 3*

## Agreements

Diplomatic negotiations is performed in a part of the game interface called the Diplomacy Table. The Diplomacy Table allows negotiations with only one Civilization at the time. The basic design idea of the Diplomacy Table is that the player should easily be able to trade different kinds of goods and treaties.

The center of the Diplomacy Table shows the players offerings and demands. On both sides are lists of things to demand or offer in the negotiation process. Available things range from cities, gold (lump sum or per turn), technologies and world maps to peace treaties, right of passage pacts and military alliances against common enemies.

*Illustration 17 The Diplomacy Table in Civilization 3*

Besides this the Diplomacy Table also includes two features to, in a limited sense, aid the player in the process of judging whatever a deal is good enough for the other part to accept it. Firstly, above the actual barter table a picture of the other parts leader's head is visible, which, in a limited sense, express what the leader feels about you. Secondly, on the right side above the list of offer-able things, an adviser is visible making remarks regarding the deals feasibility.

When the player thinks the other part will accept the deal he/she sends the agreement and gets a reply back telling whatever the other part has accepted or not. If the deal isn't accepted the last offering is still visible on the Diplomacy Table and the player may refine the deal and send it again. This is repeated until the deal i accepted or the player cancels the negotiations.

## Risk

Risk is a classic tabletop game of war and negotiations. The setting of the game is 2-6 nodes of power (players) struggling for world domination. The goal is to through military power and negotiations with other players become the ruler of the entire world.

### The Game Play

The game board contains a map of the world of play. The map is divided
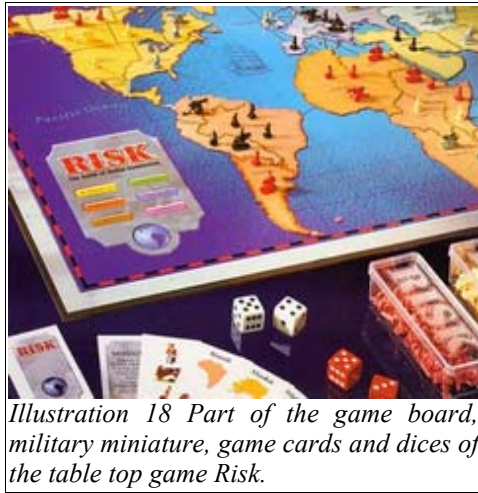
*Illustration 18 Part of the game board, military miniature, game cards and dices of the table top game Risk.*

into continents (Africa, Europe and so on) and the continents in turn are split into a number of regions. The goal is to conquer all the continents and their zones. A zone is conquered by moving an army into it and defeat all enemies located in the zone. The players are given new armies at a rate that is calculated from how many zones he/she controls and how many continents he/she has total control over.

The outcome of the battles is highly determined by luck and size of army. This leads to a less tactical and more strategical game-play, important decisions concerns were to place the troops and were to attack rather than how to carry through a particular attack.

The game board contains strategical important squares, for example, if a player conquers all of South America he can only be attacked at two zones, leading to the opportunity, for the player, to leave just one troop at every non border square since there is no way to directly attack them.

## Agreements

The rules stated in the previous section, defined the game rules from the game's introducing booklet. Although what we have seen, these are not the only rules used in a game of Risk. As a player becomes too powerful, that is receiving a large amount armies, domination of a large regions, other players seams to begins to plan against him/her. Pacts are formed. As an example one player may state to another player, "if you don't attack me next move, I will use my resources to prevent him from winning." The first player puts his own power position at great risk with this move. He therefore first makes an agreement with the other players, not to attack each other.

This rule of agreement making is not part of the formal games rules. Instead the rules of the agreement making varies from play to play. In some game sessions, the agreement creation, as the above, is not permitted and in others is seen as a part of the game.

What is also to be noted is that the agreement made between players are easily broken. In the scenario above, there is no contract binding one to stick to the agreement made. After the player in question has used his armies to weaken, the all to powerful, player, one of the other players may

attack him although an agreement has been made. This is also often part of the informal game rules and is not treated as cheating. Although if a player breaks to many agreements, he/she often gets a hard time receiving help and support from the other players.

To summarize the above. Risk is a tabletop game of formal rules, although informal rules are also often used during play. Making agreements and pacts is an important parts of the game if one wants to be successful. The negotiation process takes place completely outside the game, there are no formal game rules regulating the creation and breaking of agreements.

# Focus Group Discussion

During the focus group discussion, discussing the general game design, we raised the question of communication in a game of Worlds. Is it wanted or even possible to restrict or control the communication between players in the game design? The text that follows are excerpt from that discussion[31].

The discussion of player communication started the session. The possibility of this where positive. It should be available in Worlds. A game chat was the first suggestion. There was also an opinion that the communication should be an "in-game chat", reachable when playing the game. A game world where one is able to communicate between the players of the game would create the image of a living game world. The participants also noted that having communication "in-game", that is having the communication facilities as part of the game software, created a broader sense of "being there", than having these possibilities outside of the game i.e. a web forum or a IRC communication.

> One could have a chat outside the game, but it's if one also has it "in-game", otherwise one doesn't get that on-line feeling, that there are other players surrounding you.

As the game of Worlds is a persistent real-time computer game, there would be moments when a player can't actively participate in the game and thus, in some way, have to update oneself about the game when returning to play. The participant stated that it is often useful to have some sort of message or event history. Some examples where brought up.

> Communication possibilities between players are often useful when one wants to brief oneself of the game worlds action. Like if you have been off line for some days. Then it's easier to get the information from a friend or another player than going through hundreds of line of event history.

Talking with other players is often used as relocation facility as it's pushed forward by the participants. A history buffer, storing events or game messages, would probably be of great length if one has been away from the game for some time. Therefore it is easier, the participants notes, to get the information from another player. A player could sort out the essential information and leave out the irrelevant. A computerized history buffer does not often make any different between, to a player, relevant and irrelevent information.

Another scenario, taken from the focus group discussion, follows.

> When one notices that something has happened in the game world, it is

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31 Transcription of Focus Group Discussion, 2002-02-20 and Summary of the Focus Group Discussion ,, 2002-02-20.

> because someone else has been there. You could send a screenshot, "check out what happened, and the best part I was there!". After that someone talks about it in a chat room, "by the way, where you present when this happened?", and so on.

The discussion is about the computer game Anarchy On-line, a massive multi-player game. The game world is of great size and it would be very hard to be aware of everything what happens in the game world during play. The Awareness of events, as stated by the participants, it is often given through participating or passively attending in a chat room. From the excerpt above snapshots of game events, taken by the game users, where used as a start of a discussion or retelling process.

A discussion of what information should be available for the different game characters followed.

> One could build the game chat on different levels. A player could be talking on his county level, but he should also be able to talk with the adjacent counties and after that the entire country or the world.

The above excerpt suggested that the game communication facility could work on different levels. As a player you could choose which group of game characters that should be part of a discussion.

> (Participant 1)
>
> Say for example a farmer, he should by default get the same information of the world as the king gets.
>
> (Participant 2)
>
> Exactly, it is a part of the game to get hold of more information.

Depending on a game character's geographic location, profession, power position or relation to other game characters, different communication possibilities should be available. All players would not receive the same game world information just by attending in the game chat. Participant 2 states, it would be up to a player to talk to other player to receive more game information.

> Another thing that would be good is if there where some kind of status dialog that could show information about the land that one is a member of or other similar things. "This is the king's policy: he wants that you have big families with a lot of children. We are to take over the world and are in need of men." If you are a farmer you could get information about the amount of wheat your land needs etc.

The excerpt above shows the same discussion, players does not always want all information or the same information to be available to other players.

The discussion continued.

> Communicated information doesn't necessarily need to be true, one aspect is to validate the information. Information could be just plain gossip.

and

> A vital ingredient in a game like this should be the flow of information. Some information you don't want to share with others, some information, by some reason, you want others to find out or be aware. That is rumors!

The participants brings that up when communicating with other players, the events discussed are not always what actually happened, the information is not always true. It could be necessary to validate or double check that information.

> (peasant )"Why do we get so low salary?"

> (king) "I'm sorry but I can't afford more, this is bad times."

> Then when you double check you notice that the king has a lot of money and he surely could afford to strengthen your salary. Then you could start a revolt and dethrone the king.

The discussion of the amount of information a player should be aware of continued.

> (Participant 1)
> An interesting idea would be, say for example that a player is in a trade relationship with another player, trading wheat. Then maybe the first player gets an better proposal from a third player and therefore ends the trade relationship he had with the other player. Then the player that went off-line could get a SMS message asking if he would like to propose a new and better trade offer.

> (Participant 2)
> Well that depends. Maybe the first player doesn't want to continue a friendly relationship with him anymore. Then he must be able to do so.

> (Participant 1)
> Yes, but one should not have to tell that. It's the servers task to inform, " he cut of the flow of wheat do you want to give make another offer?". Then one could give another offer but one doesn't know the reasons.

The player should be able to communicate an action, but not necessarily the reason of the action, to other affected players. The underlaying reason is up to the player to figure out by himself. In the excerpt above, the focus group participant suggested that the games server should update the players involved if for example a relationship was broken. The information by the game server should explain what has happened not why.

The discussion then turns to concerning different ways players can

communicate.

> When you create a game account you could enter your e mail, ICQ address or Microsoft Messenger id. Then, when playing, one's address should not be visible to others. Instead one should be able to send a message to "this person" even though one doesn't know the address. When the message is received it should not display the address from the sender, instead it should be from "the King" or "this game character".

When communicating with other players the participants suggested that one should be able to act on a non-personal level. A player should not be forced to use one's own name, email-address or ICQ number, instead the name of player's game character should be used.

> When receiving and sending messages it should be "in game". One should not be able to read it in ones own mailbox, instead a game message should go to a special account that is bound to the game. /.../ A message should always go through that account because as a player you do not want to tell everyone who you are.

The participant discussed that messages sent to his/her game character should be visible in the game. One should not have to leave the game to check one's private mailbox to get game information. The discussion about receiving game information "in-game" was brought when discussing a "newspaper" function in the on-line multi-player game Anarchy Online. The newspaper displayed the recent news of the game world on a web page that players could visit. Although the newspaper could not be read in the game. This lead to that players playing the game where not updated about the changes of the world and thus many unpleasant and confusion events could happened to them.

The discussion of game communication ended with the note that in many on-line multi-player games where communication between the game's user is available, new rules and way of acting is creating during play.

> People create their own goals and rules in the game world when playing.

An example is again taken from the on-line multi-player game Online Anarchy illustrates this.

> New professions have been created during play. People creates their own adventures between themselves, Players have joined forces creating mob organizations, threatening other player and so on and such. Maybe it is the designer's thought that they do so, but in that case it's up to the player to figure that out.

What is tolerated or considered game rules is as much created by the designer as it is created by the people playing and the community of the game.

# On-Line Forums

It has been hard to discuss concrete design on the on-line forums, because of the nature of the usage of the media . The forum discussions have instead taken the shape of a conceptual exploration of the subject. In this chapter we will present a summary of, for the thesis, relevant parts of the on-line forum discussions[32].

First one note. The participants strongly declared that it was important to keep in mind that the communication was to take place in a game, thus the key part is to make it entertaining. A great example of this is provided in the following excerpt.

> Remember that quote: "If real life was so great, we wouldn't play games." I take that to mean that a game can get too realistic.

The point is quite clear, the purpose of a game is not to fully simulate the real world, but rather to extract the interesting parts and put them into the simulation in a challenging way. In the case of the game Worlds, lying and trusting seems to be the fundamental parts of the game-play.

> I see the game revolving around the relations between the players. There would be constant political jockeying, power struggles, second-in-commands, falsification of information, slander, players acting as double agents, selling of valuable information, propaganda, public information and disinformation, etc.

One hot topic in the on-line discussions was whether the players should be able to communicate freely or should be forced to do all communication through the game engine. A distinction was made between in-game and out-of-game communication.

> Communication can be divided into two broad types: IN GAME communication and OUT OF GAME communication. OUT OF GAME communication would typically be represented by email. IN GAME communication would utilize the game's servers for information transmission.

The reason given for forcing the players to use the in-game means of communication was simply that the game engine otherwise wouldn't be aware of the current state of the game world. If the players were able to communicate through out-of-game artifacts they could, for instance, form secret pacts that the other players had no ability to find out about in the game. This was generally regarded as cheating in the beginning of the discussions.

32 On-line Forum Discussion 1. 2002-05-09 and On-line Forum Discussion 2. 2002-05-09

> I have been trying to come to terms with how there could be public information and private information passed between the players while preserving the possibility of other players intercepting or eavesdropping on this information. What I absolutely would like to prevent is two players swapping email addresses and then sharing information completely safe from all the other players. So, there would have to be some ways of preventing players of giving another player his email address. At first, this may seem impossible. But there might be a way by providing a limited set of communication between players that would prevent this.

And there were even lengthy design discussions regarding how to implement the game to prevent the players from communicating outside the game.

> A good numerical hash function could be used to allocate numbers to the remaining set of players. No real player info can be allowed, players should only have access to Internal Game info.

As suggested by the above forum post the general idea was to hide the players actual "real" identity making it impossible for the players to contact each other. Further did a lot of the participants suggest that the communication should be encapsulated and thus hidden in the program code.

> Communications between players may be limited to actual Game objects.

Besides, and in some sense extending on, the hiding ideas a value adding concept got some attention in the discussion.

> I am leaning towards a model which enables real information to pass between players which has more value added to it if it is sent IN GAME. Something along the lines of adding the bonuses you have described in conjunction with real communication. So, if players choose to use email communication, they don't realize the added bonus. It would be considered 'fair play' to use email, analogous to a secure RED PHONE, but they will miss the opportunity of value added bonuses by using IN GAME communication.

In the above forum post the author argues that there maybe should be a little bonus given when the players use the in-game communication. This bonus could for instance be in the form of victory point, skill or income increase.

At the time the discussion had reached this far, one person made a good point regarding the cheating argument that pretty much changed the course of the whole discussion.

> There'd surely be discussion forums, people learning about the game from friends, people playing from the same physical location, etc. One way or the other there will be out of game communication. If the game clearly considers this as a form of cheating, players will be unhappy because other players will clearly cheat.

After this post the overarching solution offered by the forum thread concerned motivating the player, instead of forcing, to use in-game messaging facilities.

> I agree. I don't think it is really feasible to prevent players from engaging in out of game communications. But I do want to encourage players to use in game communications to make it possible for spying on these in game communications by other players. I think you have possibly come up with a way to promote this by thinking of communication packets as game objects.

One motivation for the players to use in-game communication is to be able to prove the other players eventual treacheries.

> If two players create a secret alliance, they sign a treaty. If one of them betrays, the other can (depending on the laws these two abide to) claim treason and have the alliance document as proof.

An extension to the treachery concept, that also regards however the players should use in-game or out-of-game messaging systems regards information hiding.

> It is extremely important that every information the game provides is not 100% reliable. Also that hiding information is pretty easy. All spies can become double spies and send back reports made up by other players. This way every information has to be checked and double checked. Relations between players would be crucial here. Having someone you can trust - a most important asset. Having someone that trusts you (especially in a position of power)-1000 opportunities of treason.

Whom to trust would be an important question to answer for a player of such a game. Choosing to share or not to share information might even be a part of the game-play.

> The players actully build and form their own power hierarchy amongst themselves. This could have some fascinating side effects. One player might be elected to be the head of intelligence. This player, while not the head of state, has a great deal of power. He is essentially the owner of the state's intelligence, and might choose to share or not share certain intelligence with the other members of his government to enhance his power. This is very much like what goes on in the CIA and FBI. J. Edgar Hoover, former head of the FBI, was notorious for doing this.

The above forum post excerpt speaks of information distribution as a source of in-game power.

Lastly a post provided a suggestion for how in-game communication could be kept flexible and allowing use of external communication facilities.

> Through freeform discussion, players may decide upon a voting method for a purpose. During freeform discussion, any player or group of players may propose who the members of that voting group are. All players must agree to

be a part of that group. The members of that group are submitted as a 'voting group' to the game. Associated with that 'voting group' is a name or purpose. Examples might be elections of senate members, voting on laws, etc. There can be any number of 'voting groups'. Once a 'voting group' is created, a 'proper' communication channel is chosen to inform members of the 'voting group' of what items are to be voted on and the frequency of such votes. Theoretically, there would be a number of different 'communication channels' and it is up to the members of the 'voting group' to decide on the most appropriate, based on security, speed, location, etc. Additionally, the members of the 'voting group' must decide on how the vote occurs. It could be by secret ballot, or non secret ballot.

Since the game is informed of the 'voting group' it can then provide the means that a member of the 'voting group' may vote when a vote is called for. The results of the vote would then be reported to the members of the 'voting group'. It is up to the members of the 'voting group' to abide by the results of the vote.

This is pretty much what, for this thesis, interesting thoughts came from the forum discussions. It was decided on that the game should utilize the ability to use both in-game and out-of-game communications since they both have their pros and cons.

# Workshop

During the workshop performed, we set the focus to discuss how to design the game Worlds to allow the players of the game to create dynamic agreements and proposals, not yet known to the game engine. Some thoughts spoken during the discussion are presented here.

When the discussion started the participants agreed that there were attributes in the game that could easily be made part of a contract.

> We have to have predefined parameters. Then you could drag and drop to get them into the agreement.

The participants suggested that all variables like wares and goods, such as gold, iron, trees and money could be presented to the player when creating a proposal or a contract. These bargain objects would be predefined parameters in the game and as a player you should be able to choose which of them to be included in the agreement. As the discussion continued some participants where troubled by this solution.

> You could have a list of all the variables in the game. But It gets difficult if you are to be able to use own defined variables. Then you have to change in the game engine.

It was agreed that many variables could be predefined in the game, but doing this could make the agreement stale and static. Although, if you created your own variables to be used in the agreement you would probably have to make changes in the game engine.

The discussion continued.

> If you don't write it down yourself, you will limit the agreement to a great extent.

> Yes but maybe you do a spelling error on say four of the words. Then you have to have some kind of spell check, which will take a lot of work. But then what if you have a non valid sentences structure, then you have a problem.

Instead of letting the players choose from predefined variables, some participant suggested that the players should type in their own agreements themselves. This would, as they explained, not limit the agreement to the same extends as the first suggestion. Although the written text would have to include some keywords to be understood and computable by the computers, it would anyway feel more dynamic than the previous alternative.

The suggestion of allowing the players to write their own contract lead the participants back in time to the age of text based adventure games. In

45/69

these games, as a player, you wrote shorter sentences like "ask old man about rumors", "use ruby on necklace", "give necklace to old man".

> We are back with the old Adventure problem. When you wrote the word Carl, the program would answer, "Hello Carl" or "I don't know the meaning of Carl". When you wrote a dirty word to the game , and I bet you all have, the program would answer, "Hello (dirty word)" or "I don't know the meaning of (dirty word)".

A problem with players typing in the agreement in free form was noted by the participants as illustrated by the adventure game excerpt above. The computer would have a hard time to understanding players writing their own sentences, due to spelling errors, wrong sentence structure or the lack of specific words in a program.

The problem was further explained as the following quote shows.

> You have many words in a sentence that creates it's meaning, nouns, verbs, adjectives. You just can't take out one word of a sentence and know it's meaning.

The keywords, that would be needed for the computer, would not only suffer from the spelling errors and the problems stated above. The meaning of the keywords would, as the participants noted, depend on the other words of the sentence.

After the discussion of players typing their own agreement, the discussion went into another direction. To structure the sentences problem discussed, templates was suggested. This to make the agreements and contracts more computable.

> You could have some kind of drag and drop features where players can drag words into the templates of the agreement. In the box "my offer" I drag the "hard things" of the game i.e. you get these money and this army. Then you could drag in the things I want of the other person.  When you have set these hard things, you have to define the "soft things", like promises. I promise to attack this person if he gets close to the boarder of my county.

As shown in the excerpt above, a player could, in a scenario, drag different words of meaning into the template thus create an agreement. The participant also divided the words of meanings into two categories, hard things and soft things. Words that could be categorized as hard are thus easy computable words such as 100 trees or a legion of foot-soldiers. The soft would be words that are harder to define and are more dependent on the context of the agreement. Another excerpt follows.

> There are always variables that are effected if you have, "soft things" as part of an agreement, I promise, you promise, to help, to attack, to maintain etc. Then you have this template and all the hard things of the game should be available.

Although the soft things are troublesome due to their nature.

> The problem is that there are certain parameters that you can't define or have control of. There are so much things that you can "promise" to do. And what is really a promise

A soft thing, as called by the participants, can't really be defined or be controlled. Why this is, is later explained.

> What you must also take in account is "how" the information is valued by the players. To what degree are you to take an agreement, how is it measured. What are the importance of a sentence. Everybody have their own understandings of an notion. We all, for example, had our own understanding of this workshops focus.

The notion of a soft thing would then be a word that are not easily defined by an algorithm. A soft thing would be heavily dependent on, for example the relation between the to players or the culture of the player, that is variables that lies outside the nature of the computer. How would you define a promise to a computer? Is a promise between two best friends valued the same as a promise committed by two people that just have met. Or the agreement, "I will not take part in your business, if you...", to what degree will one not "take part" in the others business. No real solution was defined during the workshop.

To end this chapter, some design suggestions noted by the participants, follows.

> I still believe that you have to write you own agreement and proposals, that is that you can type in your own text. Then you have to send it to the other player involved in the agreement and he can then add, delete and modify the text and thus create a mutual understanding of the concepts.

> You could have a board of real, human, players where you had to bring up you contract to a discussion before approved and made available to the game.

> I believe that you have documents where you can click on certain words and when this is done a predefined sentence is generated. There will be a lot of predefined documents and words but I think this is more right than to let the player write her own documents.

# Part III
# Discourse

This far we have shown communication in computer games from several perspectives. Different voices has been heard from the empirical material that we have collected. But is there any common ground for these different sources of information?

In this part we will look further into the material of our empirical study. We will discuss, for this thesis, interesting relations between the different sources of information. The goal is to show what is important in the design of a negotiation system for a distributed persistent computer game.

This part is divided into three chapters, Agreement Creation in Computer Games, Design of Agreement Creation in Worlds and Summary. We start by establishing a theoretical foundation for further discussion in the first chapter. We make extensive use of both empirical material and academic readings to make our stand. In the second chapter we bring the theoretical foundation into a concrete design of a agreement creation interface for the game Worlds. Finally in the third chapter we summarized our conclusions of this thesis into a framework for design and point out further important areas of study.

# Agreement Creation in Computer Games

Before we start the creation of our theoretical foundation we want to make a reestablishment in the readers mind, of the focus of this thesis. Lets go back to the question of this thesis which is as follows:

> How to make dynamic informal conversations comprehensible by a computer system such as the distributed persistent computer game of Worlds?

The first question one might ask oneself is, is this really a problem? Is there a problem of transforming informal conversation to computable data? To answer these questions one must define what one mean with transforming. As we see it transforming could mean either automatic translation of the conversation by the game engine or a translation by the participants.

## Automatic Translation

Regarding the idea of an automatic translation, and the general structure, of a conversation the researcher Lucy Suchman touches the subject in her book Plans and Situated Actions.

> An argument of the preceding chapter was that we never definitively determine the intent behind an action, in that descriptions at the level of intent are not designed to pick out mental states that stand in some relation of strict causality to action, or even, in any strong sense, of one-to-one correspondence. Instead, intentional descriptions classify over situations and actions, as typifications that invariably include an "open horizon of unexplored content". In spite of this inherent indeterminacy, intentional descriptions not only suffice to classify purposeful behavior but, given the unique and fleeting circumstances of situated action, and the need to represent it efficiently, seem ideally suited to the task. Attributing intent in any particular instance, moreover, is generally non-problematic, even transparent, for members of the society who, from their practical perspectives and for their practical purpose, are engaged in the everyday business of making sense out of each others' actions. When disputes over the significance of an action do arise, the uncertainty of intentional attributions becomes a practical problem, but in such cases it is the "right" interpretation of the action, not the facts of its inherent uncertainty, that is of interest to participants.[33]

Suchman vindicates that the meaning of actions can't be predefined but rather is an ad hoc interpretation of a particular situation. This makes it hard, not to say impossible, to make an algorithm that can make a meaningful interpretation of a conversation. One participant of the workshop made a remark on this problem, when he talked about the text-based adventure games of the seventies and eighties, where words and

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33 Suchman, 1987:68

sentences where written into the game.[34] The workshop participants gave some reasons for this being so.

> The computer would have a hard time to understanding players writing their own sentences, due to spelling errors, wrong sentence structure or the lack of specific words in a program.[35]

This is far from being all of the explanation though, as Suchman describes in our quotation, the real problem rather lies in sense making being a situated action.

## Manual Translation

The other possible meaning of transformation, that was stated earlier in this chapter, was a manual translation performed by the participants of the conversation. As humans is able to make sense of everyday conversations we may quite clearly state that a manual translation is possible. As Suchman notes in our quotation though, disputes over the significance of an action may occur. The researcher Yvonne Dittrich also addresses the complexity of sense making. As a ground for her discussion she uses Wittgenstein's concept of language games[36], which as Suchman claims sense making to be a situated action.

> The meaning of a term is not independent of it's use; it is defined by it. As every term might be used in different language games, it has different but related meanings.[37]

When designing a computer application the designer attach a modeling structure to the application. Dittrich claims that the user of an application have to map, before use, the model of structure to the situation at hand. That is, the computer application changes the language game at hand, as it has to be interpreted and put into relation to it's previous definitions. Thus the meaning of a term is defined by the designers as well as the user(s) of the specific context at hand.[38]

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34 Workshop, p48.

35 Workshop, p48.

36 A language game takes place in the setting of a particular conversation. Just like any game the conversation is guided by rules which gives the words its meaning. These rules are ever changing and adopting to the current setting of the conversation.

> In the context of normal language games rules enable mutual meaningful action of the 'players'. In a social setting we develop a special but common way of practice and language. This enables us to communicate and coordinate our action. Even 'breaking the rules' of language and action, acting and talking not to the established practice, becomes a means of communication. The rules of language are based in a regularity developed by a community. Following the rules or 'breaking' them meaningfully becomes an elaborate practice in itself. (Dittrich, 1998:4)

37 Dittrich, 1998:4.

38 Dittrich, 1998:5.

## Is There a Problem?

Since automatic translation of a conversation into game engine comprehensible data isn't possible and even manual translation might face disputes over the interpretation of the meaning of the conversation we believe the answerer is yes.

For instance the excerpt of a chat between two players of Worlds[39], that starts this thesis, illustrates a negotiation that ends in a, fairly complex, informal agreement. It can't remain informal since it involves other entities in the game world that must be aware of the agreement. In this case Sir Baal is to give Gaarm some parts of his county, which the people that lives in those parts must be aware of. Since population groups in the game Worlds are controlled by an artificial intelligence (A.I.) the only way to do this is to get the agreement into the game engine.

If we stay at the "land giving" part of the agreement in the formalization process, a probable area of dispute should be what parts of the county belongs to the southwestern wastelands. In the informal discussion this is not addressed at all, both players probably have an idea about what is included in the southwestern wastelands, but will that idea be coherent when it is time to formalize the agreement? Probably not, the giver will most certainly find the southwestern wastelands much smaller then the taker. Thus the negotiation will continue during the formalization process.

In the further discussion these remarks will be used to discuss the difficulties and possibilities in the process of making a informal conversation comprehensible to a computer system processing a game of Worlds.


## Aspects of Communication

The problem stated in the previous chapter, although serious, depends on whether or not the result of the negotiation reaches the game.

Throughout the contact, during this thesis, with players and designers of computer games we have noticed a tendency to separate the player's communication in the game into two levels, in-game and out-of-game communication[40]. What do they mean by this separation and what implications for design might this lead to?

In-game communication regards the forms of communication that is built as a part of the actual game. Out-of-game communication on the other

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39 Introduction, p6.
40 Focus Group Discussion p36, Focus Group Discussion p39, On-line Forum p41, On-line Forum p43

hand is communication performed completely without any involvement of the game software. A phone call, a SMS sent from one's cellphone to the other's or a face to face conversation are all examples of out-of-game communication. A real-time chat in the game, a message sent from the game to the other part's cellphone as a SMS or filling in a form on the game's website, that somehow is sent to the other part, are all examples of in-game communication.

Important to note is that, in the above examples SMS is both regarded as in-game and out-of-game communication. SMS as a technology isn't either in-game or out-of-game, it is in a particular use situation this distinction can be made. If a player sends a message in the game and the game engine forwards that message to another player's cellphone through a SMS it is regarded an in-game message. The revers is also true for an in-game message when a player sends a SMS that is received by the game engine and forwarded to the other player. Thus a communication facility can have the shape of both enabling in-game and out-of-game communication, but the ability does not necessarily have to be used.

Then what implications for design does this separation give? An out-of-game communicated discussion would make the communicated data unknown to the game-engine, but known to it's participants. Does the agreement made out-of-game not affect the game world's status then? A direct affection would not be made if the participants didn't enter the outcome of the out-of-game agreement into the game engine. Although an awareness, amongst the participants of the out-of-game discussion, would be created and this would eventually effect the game world. This would surely also in some sense affect other players of the game. Through the discussions made a platform for further decisions and discussions are established. The rules of a particular language game will be shaped from this platform and thus affect the actions of the parts involved. In the long run also nonparticipants of an out-of-game discussion will, through acting and experiencing actions in the game, reach a basic level of awareness. The CSCW researcher Mark Robinson talks about something he calls Mutual Influence.

> One central problem of cooperative working is that people usually do not know the thoughts, intentions, and feelings of, or "facts" available to others with respect to a particular issue. These are discovered in the course of conversations and discussions in formal meetings and informal encounters.[41]

To be able to fully participate in the game the players must have a more than basic level of awareness of the game world's current status. If a large part of the game world's current status is maintained out-of-game some

41 Robinson, 1991:40.

players, especially newcomers, will have a hard time to follow the status development. But, on the other hand, if the designers of the game tries to force the players to use in-game communications only, collaboration in the game will be hard. Robinson claims that, to understand other participants and thus to be able to cooperate, one must have both formal meetings and informal encounters. The need, or rather necessity, for this duality in communication was also expressed by the on-line forum participants. After designating out-of-game communication as cheating, in the beginning of the discussion, and thus something that should be prevented, the participants changed their mind and saw out-of-game communication as something that couldn't be prevented. It was rather seen as a natural consequents of a multi-player game.[42]

By accepting in-game and out-of-game communication one is also accepting the use of formal and informal information and agreements in the game. Since there always will be informal information and agreements in any kind of complex social activity, such as a multi-player game, we believe this acceptance is an important step towards a well designed application.

## Hard and Soft Game Objects

During the workshop session the discussion was about how to make an informal agreement formal to the game engine. In the discussion of the workshop a large part of the participants agreed on the solution that the variables of an agreement would have to be predefined in the game by the game designer. The participants also noted that the predefinition of what an agreement could consist of, would make the agreement more static and less dynamic than an informal agreement. In other words the model structure of the informal agreements made would then have to be mapped to the model of the designer to successfully be computable by the game.

The participants noticed a problem, when analyzing an agreement example handed out as support for discussion. Some things in an agreement might not be easily defined, neither by the designer in the predefinition process, nor by the players in the agreement transformation. As a figure of thought they defined two types of objects, hard and soft game objects.[43]

Hard objects were primary used to describe the material things of the game world, such as trees, swords and gold pieces. Soft objects was on the other hand used to describe immaterial things such as peace treaties, promises of support against someone/something and/or promises of obedience. The later was regarded, by the participants, as difficult, but

42 On-line Forum, p43.
43 Workshop, p49.

necessary, to predefine since it would be hard to have a mutual understanding of such an object.[44] For instance what if one player stated to an other player; "Honorable Sir Baal. I, Gaarm, will take your part in your war business against Lord Melkor, if you give me a hundred pieces of gold!"? In the example the demand , 100 pieces of gold, stated by Gaarm is to be considered a hard object and the promise, to take Sir Baals part in the war, is to be considered a soft object. What do one include in taking ones part? Does it include providing military forces to Sir Baal's armies, trade embargo's against Lord Melkor, giving Sir Baal spy reports and/or to be passive and tolerate the war? A soft object is therefore an object that requires further definitions before it can be regarded as formalized.


## Iconicity vs Flexibility

The Computer Science researcher Reinhard Keil-Slawik talks about what he calls iconicity versus flexibility. The notion of iconicity versus flexibility is set to describe the use of predefined patterns or work flows of action, and the freedom of choosing one's own operations to fit the context at hand. He describes the progress at hand when going from iconic artifacts to more flexible ones. In the statement that follows, Keil-Slawik views artifact as the external memory of our cultural evolution.

> With every new artifact – from the tally to the abacus, the Indian decimal number system, and finally algebra and Turing machines – the sequence of bodily operations required to obtain a result has been reduces. /../ As a result, more powerful operations can be performed in less time, with greater flexibility and reliability. But there is also a new quality: enforced or prescribed sequences or operations that do not allow us to create a gestalt, but which nevertheless have to be performed, are condensed into single objects or operations that can now be flexibly arranged anew and related to each other to for new gestalt or insights. [45]

Keil-Slawik states that the price we have to pay for flexibility is that the objects that is employed becomes less meaningful. This due to that the degree of iconicity is reduced. But he also shows that the increase of flexibility also widens one's repertoire of possible actions. The gestalt or the meaning of a form is a construction of the observer, the interpretation one creates of a context or an object.

In the example shown by the workshop participants, when one formalizes the agreement conditions into predefined objects, one also makes the agreement more iconic and as a result of that less flexible. The level of abstraction must therefore, in the game of Worlds, be weighted

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44 Workshop, p49.
45 Floyd, Züllighoven, Budde, Keil-Slawik, 1992:182.

against the importance of making a particular set of data comprehensible for the game engine. It's important to strengthen the notion of iconicity in these Soft Objects, the immaterial concepts of the game. Thus more likely creating a shared understanding of it's meaning.

In the begin of this chapter, Hard and Soft Game Objects, we wrote that the participant noted that the predefinition of variables would make an agreement static. Although the discussion of hard and soft game objects and the notions of iconicity vs flexibility, shows that the predefinition of variables would also create a more shared and clearer understanding amongst the players, when using these variables in the making of an agreement.

Again we state that flexibility of a notion must be put in relation to the loss of a mutual understanding between the users.


## Mutual Understanding

To be able to create a mutual understanding of the game and the status of the game world and thus the agreements made, amongst the players, we must look deeper into the nature of creating such an understanding.

The previous chapter, Hard and Soft Game Objects, showed how the meaning of a notion could vary between participants in an agreement, although we never touched the mutual understanding of the context, in which the game object becomes meaningful. We discussed why this understanding is needed but not so much how to design an environment that supports the creation of such a mutual understanding.

Double Level Language is used by Robinson to show that to create an understanding one must have access to two different levels of language. These levels are by Robinson mentioned as formal and cultural.

> In general, it can be said that any non-trivial activity requires effective communication that allows both ambiguity and clarity /.../ The "formal" level is essential as it provides a common reference point for participants. A sort of "external world" that can be pointed at, and whose behaviors is rulegoverned and predictable. The "cultural" level is a different type of "world". Interweaving of subjectives in which the possible and conterfactual are significant as the "given"....interpretation and viewpoint take the place of rules and predictability. The formal level is meaningless without interpretation, and the cultural is vacuous without being grounded.[46]

We exemplify this with the previous scenario from the game of Worlds, "Honorable Sir Baal. I, Gaarm, will take your part in your war business against Lord Melkor, if you give me a hundred pieces of gold!". Discussing the notion of Double Level Language, Robinson reminds us that "Conversations (even conversation about conversation) is always

46 Robinson 1991:42.

conversation about something"[47]. That something is stated as the formal part of a conversation, and the talk around it, defining that something, creating it's context, are the cultural level. To come to an agreement thus making an understanding of the other part's demand and requests both the formal and the cultural levels becomes important or rather necessary. The game objects provides a common reference point for the players as they are rule based, and the talk around the game objects, why they are in focus of a agreement would be necessary to create an understanding of the motives and meanings of the agreement in focus.

Not supporting these two levels of language in an environment could therefore lead to an insufficient mutual understanding. The game object of an agreement could create part of it's understanding, but without the support of the cultural level it's full purpose, necessary for the actual meaning of an agreement, will be hard to comprehend.

47 Robinson 1991:43.

# Design of Agreement Creation in Worlds

You have now come to the chapter where we will discuss our design solution of agreement creations in the computer game Worlds. The previous chapter presented notions of importance for the negotiation process between players of that computer game. Our design solution relies on these notions as well as the feedback given by participants during the development of Worlds.

One important goal of our design has been to make the game engine "aware" of as much as possible of the agreements made between players of the game. When this has not been possible we instead have tried to make it a part of the game on an informal level. Our design presented in this part are focused on the full screen PC client, that will be the main client of the game.

## The Agreement Creation Interface

As starting point for the description the scenario introducing this very thesis will be used. First lets take a step back to that scenario and reestablish a clear picture of the agreement that came out of that negotiation.

> *<Sir Baal> Gaarm: That would be great! So you let me pass through your lands at any time if I give you the southwestern wastelands and above that you will let me buy all your iron as long as the war continues.*

> *<Gaarm> Sir Baal: Yeah, and for the iron you will pay half now and half when the war is over.*

> *<Gaarm> Sir Baal: Sounds like a deal to me![48]*

From this excerpt we can extract the components of trade in the agreement.

- Sir Baal may pass through Gaarm's lands while in war with Melkor.
- Sir Baal is to give Gaarm the southwestern wastelands.
- Sir Baal may buy all of Gaarm's iron as long as the war continues and he will pay half of the price at the moment of buy and half when his war with Melkor has ended.

The next step for the players is to formalize the agreement into a contract comprehensible by the game engine and it's simulation engines. To do this one of the two players must make a contract proposal and get the other player's approval of its validity. The player not creating the contract may, if

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48  Introduction, p6.

he/she wants, take part of the creation as an real-time in-spectator. By entering the in-spectator mode the player gets the same view as the player creating the contract, with the difference that the in-spectator are unable to make any direct changes to the contract. Through letting both parts be viewing the formalization process, of the informal agreement, and by providing the players with the capability of co-performing a real-time discussion, we intend to support a mutual understanding as we provide the possibility of a double level language.

The following illustration shows a more detailed description of Lord Baal's creation of the contract proposal.

Our interface solution for formalizing informal agreements consists of two windows, in the shape of old parchments. The left window contains the tools for creating the contract proposal[49] and the right window will contain the actual contract proposal[50].



*Illustration 19 The Formalization of an Agreement Into a Contract*

When a player is to create a contract proposal the first thing he/she must do is to choose the type of the contract. This is done by choosing, in the tool parchment, one of many predefined templates such as Trade, Relationship, Threat and Army Conscription. This will generate a contract parchment containing the most basic parts of such an agreement. In our example though the agreement reached between Sir Baal and Lord Gaarm is to complex for such an template. To support these kind of cases a free form template is also available. Sir Baal chooses the free form template and an

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49  This window will hereafter be referred as the tool parchment.
50  This window will hereafter be referred as the contract parchment.

empty contract parchment is created. The continuing process, of creating the contract proposals, consists of the player, creating the contract, dragging keywords into the contract parchment. Doing this generates a series of words, and further keywords. The following outtake, taken from the above example, illustrates this and focuses on the component of the trade agreement, where Gaarm is to pass through Sir Baal's lands while in war against Lord Melkor.

First Sir Baal drags a Character game entity into the contract parchment. Now he may select one character of the game world[51], in this case he selects Lord Gaarm[52].



The selected character becomes the basis for the component in focus. The three dots indicates that the current component is incomplete and thus the agreement cannot be sent for approval by the counterpart Lord Gaarm.

The next step in this case is to drag a game object into the contract parchment. Since Sir Baal wants to pass through Lord Gaarm's lands he drags a Diplomacy game object into the current component. He now chooses the right of passage option from the array of available diplomacy objects. By choosing the right of passage option, two predefine words, "has" and "through", and a new keyword appears.   The words are dependent of the first diplomacy keyword[53] and are to help to contextualize the option, thus they make the created sentence more understandable by the players.



Finally Sir Baal have to choose what Lord Gaarm will have the right to pass through. This is done by changing the newly appeared keyword into Sir Baal's lands, that is his own.

This far we have illustrated the first part of the agreement component and  have now created a fully understandable sentence. As seen in the above illustration, no dots are visible, thus the agreement may, if desired, be sent for approval. Although in this case, the informal agreement made by the players, had a condition for Lord Gaarm's right of passage through Sir Baal's lands. Thus a Duration object must be used to complete the contract. Sir Baal drags in the Duration concept Conditions, and selects the keyword

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51 This is at the current time done by clicking on the keyword. With every click the keyword changes to the next available keyword in the array of game object type.

52 The blue colored words in the following pictures is used to define the, from the tool parchment, dragged in concepts.

53 The red brackets in the picture symbolizes the beginning and the end of the diplomacy game object. The red colored words in the following pictures is used to define keywords that are dependent on a concept.

> <Lord Baal> |has <right of passage> through
> Sir Gaarm's lands| <during> ...

during. Next he defines during what condition the agreement component is valid, as he selects the keyword war, from the game concept Relations.

> <Lord Baal> |has <right of passage> through
> Sir Gaarm's lands| <during> <war> with Lord
> Melkor.

To end the agreement component, Sir Baal chooses Lord Melkor as the opponent of the war. The agreement is now ready for approval by Gaarm and Sir Baal sends it away.

We have now illustrated a part of the formalization process of an agreement. If Gaarm approves the contract it will be stored by the game engine in a, for the game, comprehensible model. The contract will now be taken into account in future game calculations performed by the game engine and its simulation engines.

## The Design Decisions

We will now discuss the design decisions taken, while creating the agreement creation interface. The design decisions made are heavily connected to both the chapter Agreement Creation in Computer Games and the empirical studies Study of Games, Focus Group Discussion, On-Line Forums and Workshop.

### Communication

The first design decision we made was to give the players freedom of choice in the negotiation process leading to an informal agreement. This part of the negotiation can be performed completely outside of the game.

Even though the participants of the Focus Group Discussion regarded in-game communication as one of the most important aspect of creating a feeling of being "in the game world"[54], we believe that out-of-game also will support this feeling. First of all the out-of-game communication allows the players to interact with the game world anywhere and anytime, since the players themselves are part of the game world. The in-game chat becomes the gathering point for all players. The out-of-game talk, about the game, creates a model and a language game for use in further discussions in, for example, the in-game chat. Therefore the out-of-game talk will enhance the players experience and understanding of the game.

As noted by one of the on-line forum discussion participants, out-of-

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54 Focus Group Discussion, p36.

game communication will always be performed anyway[55]. The task for the designer, of a multi-player game, should therefore, be to provide the players with the tools, both mental and physical, to merge these two aspects of game communication into an uniform game experience. Through the games distributed nature it has been possible to create an in-game functionality, providing the players with the capability of getting in touch with other players, disregarding their current location. Aided by this functionality they may take decisions for further out-of-game communications, such as, phone calls, IRC chats or café visits. This gives the players the possibility to find and use a communication form that fits them and by that makes their double level language stronger.

Another reason for not restraining the player's communication possibilities are taken from on-line forum discussions. The participant talks about out-of-game communication and stated;

> If the game clearly considers this as a form of cheating, players will be
> unhappy because other players will clearly cheat.[56]

In the game of Worlds we have provided the players with a game world, a game scenario, game objects and rules. The game scenario and the game world where the game takes place, sets a narrative logic[57] to what directions the narrative flow of the game can take. The game objects and the rules sets the possible operations from which the player, guided by the narrative logic, creates his/hers repertoire of actions.

Although by providing the players with the tools of communication we also give the player the possibility to extend this repertoire and bring these new actions into the game. An example of this can be taken from our focus discussion. In Anarchy On-Line when players contact each other, creating mob organizations and their own adventures, they change the rules of the game.[58] A suggestion made in the on-line forum discussion was the introduction of free form discussion, where players could set up their own voting systems to handle players disputes[59]. This could later lead to a clear and accepted  form of changing the rules, by the game's participants. Similarities could also be drawn to the game of Risk where players created

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55  On-Line Forums, p43.
56  Focus Group Discussion p43.
57 A narrative logic is the rules that defines the boundaries for the directions, a flow of actions, may take in a story. The rules are defined by it's context. That is, there are no universal implementation of the narrative logic, it is situated in nature. For further reading about the notion of Narrative Logic read our bachelor thesis, in Swedish, Berättande i datorbaserade rollspel – en empirisk och teoretisk designstudie om datorspel (Storytelling in computer based role-playing game – a empirical and theoretical design study of computer games).
58  Focus Group Discussion, p40.
59  On-Line Forums, p46.

their own informal rules for a game session[60]. Theses rules together with the formal rules creates the rules used for that specific gaming community,

The intention of our design, are to give the players freedom of choice in the communication between players, thus also the negotiation leading to an informal agreement. We do not define the out-of-game communications as cheating, instead we treat this as a part of the game-play. As we believe that the rules and the game-play are as much created by ourself as designers as by the player community.


## The Design Behind the Agreement Creation Interface

The interface for formalizing informal agreements might be interesting in it's self and we will take a closer look at it in this chapter. This chapter will discuss the interface for the formalization process in the game of Worlds, both from a theoretical point of view and as compared to the Diplomacy Table of Civilization 3.

When the players are using the agreement creation interface they are basically using a script language[61]. The interface in the game is the graphical front end to that script language. The players does not themselves write the script, instead they drag and drop predefined game concepts into the contract, which is modifiable through direct manipulation. We believe the formalization interface creates a balance between flexibility and iconicity.

As seen in the example, of Sir Baal formalizing the agreement with Gaarm, the interface is divided into two windows. One containing the tools and one containing the material to shape into a formalized contract. This is somewhat similar to how agreements are made in the computer game Civilization 3. The Diplomacy Table in Civilization 3 is operated in the same way as our agreement creation interface. In both interfaces the player drags and drops game objects into an agreement.[62] There is one crucial difference though. The Civilization 3 Diplomacy Table could be considered easier to use, as the game objects already is formalized into Hard Object, by the designer of the game. The player simply drags and drops these game

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60 Risk, p36

61 A loose term for any language that is weakly typed or untyped and has little or no provision for complex data structures. A program in a scripting language (a "script") is often interpreted. Scripts typically interact either with other programs or with a set of functions provided by the interpreter, as with the file system functions provided in a UNIX shell and with Tcl's GUI functions. Prototypical scripting languages are AppleScript, C Shell, MSDOS batch files, and Tcl.
    The Free On-line Dictionary of Computing, 2002-08-17.
    *http://www.dictionary.com/search?q=scripting%20language*

62 Civilization 3, p34.

objects into the agreement. On the other hand though, we believe that the interface in Worlds is more flexible and we claim that it have to be that. To reason for this we use the extensive discussion in the chapter Hard and Soft Game Objects and in- and out-of-game communication.

> Again we state that flexibility of a notion must be put in relation to the loss of a mutual understanding between the users. [63]

Flexibility will always be created at the cost of iconicity. Both Civilization 3 and Worlds features a game-play that involves the creation of agreements. But we see a difference, since in the design of Worlds lies the assumption that the players will perform out-of-game communication with other players, as a means to negotiate. Therefore there will already be an informal agreement when the agreement creation interface will be used. This makes the range of possible agreements great in width and thus the need of flexibility becomes strong. The design of Civilization 3 on the other hand, probably assumes that the Diplomacy Table is used as both a negotiation and contract creation artifact. Through using the Diplomacy Table the player gets an idea about what agreements may be done, the interface in it's self tells this to the player. This self explanation comes, as earlier stated, at the cost of flexibility.

Our design provides the players with a tool for scripting an agreement. The game objects, that one drags into a contract in Civilization 3, are also present in Worlds and these game objects are used when defining one's own meaning of a notion. This due to that one can combine several conditions in one contract. For example, lets pretend a player was to define what he/she mean by "not taking part of one's business", this could be defined as, not to attack a certain character, not to trespass into a region, not enter a trade relationships with one's arch enemy etc.

What is done is that the Soft Object, in an informal agreement, is defined, to that degree, that it can be treated as one or several Hard Objects and conditions. In the process the level of flexibility is reduced, as the level of iconicity is increased. Although the meaning of the Soft Object is still intact as it is defined by the player.

By not presenting a strictly defined set of rules in the formalization interface, but instead giving the players a toolbox containing a wide range of tools to explore, all possible agreements will most surely never be fully discovered by any player. Of course the game contains rules, even though wide, that limits what kind of agreements that can be performed, these rules are crucial because they create a seizable amount of possible operations. The researcher Gregory Gargarian brings this forward in a formidable way in his Phd thesis The Art of Design.

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63  Hard and Soft Game Objects , p55.

> Without restrictions, a designer would be unable to choose from the possible actions he could take; he would be paralyzed. What I call *freedom in restrictions* is the counter – intuitive notion that restrictions provide the designer freedom rather then enslavement. Within a restricted collection of choice a designer can explore possible choices using trial and error or algorithmic methods.[64]

The freedom in restrictions, given by the game rules does not, as Gargarian puts it, enslave the designer/player. Instead the possibility to explore is given, using trial and error. If no rules what so ever where present, there would be no way to determine what is an error, since there would be no context, to put the result in relation to.

As earlier stated, the wast amount of different agreements available, are not by default known to the players. Not even we, as the designers of the agreement system, could grasp the entire picture. Instead the game rules and the setting, the scenario, the culture, all part of the narrative logic, guides the player, creating his his/hers repertoire of actions.

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64  Kafai & Resnick, 1996:132.

# Summary

In this master thesis the main discussion has concerned design aspects of making dynamic informal conversations comprehensible by a computer system. The discussion has at large been centered towards the distributed persistent real-time multi-player computer game Worlds. The question of this thesis is again brought up.

> How to make dynamic informal conversations comprehensible by a computer system such as the distributed persistent computer game of Worlds?

Have we, in this thesis successfully answered the question above. We believe so. By being aware of the nature of communication and collaboration as well as, in some part the, construction of notion in computer games. We believe that, as a designer, one is able to design a successful solution for the context at hand. We have in this thesis shown the result of our design, the communication and agreement creation system of the game Worlds. This could be seen as an example of how this thesis's discussion could be used in a concrete setting. We have not touched all aspects of communication and collaboration, but we find our discussion and our design, interesting and important, as an object for further analysis, discussions and thoughts.

The discussion of this thesis is based on several kinds of sources; the empirical studies of games, discussions with players of multi-player computer games, a game designer and a game programmer. Besides this the use of academic literature and the design of an actual computer game, are also brought together to create a platform of thought and discussion. This thesis has been an attempt to bring reflection and analysis into the craft of computer games making, as well as to bring aspects of game design into the world of academics.

Although, a massive rise of the game industry, as computer games breaks new ground, nearly no academic research has been made, making it a field full of unnecessary re-inventions. We claim that the field must be further discussed, creating methods and notions of use for further research and design.

# Bibliography

## Literature

Aarseth, J Espen. 1990. Cybertext – *Perspectives on Ergodic Literature..* The Johns Hopkins University Press, ISBN 0-8018-5579-9.

Bertelsen Olav. 1998. Elements of a Theory of Design Artifacts - contribution to critical system development. Ph.D. Thesis. Department of Information and Media Science.

Frank Anders. Spelandets roll i framtiden. 2000. Sveriges Tekniska Attachéer,. [http://www.statt.se/extern/rapporter/free/spel_frank.pdf](http://www.statt.se/extern/rapporter/free/spel_frank.pdf), 2002-08-17.

Gustavsson Fredrik, Lyrstedt Daniel. 2001. Berättelse i datorbaserade rollspel - en empirisk och teoretisk designstudie om datorspel. Bachelor Thesis. Department of Human Work Siences and Media Technology, Blekinge Institutet of Technology.

Kafai, Yasmin, Resnick, Mitchel (red). 1996. *Contructionism in practice - designing, thinking, and learning in a digital world*, (LEA), ISBN: 0-8058-1985-1.

Robinson, M. 1991. Double level languages and co-operative working. AI & Society.

Floyd Chritiane, Züllighoven Heinz , Budde Reinhard, Keil-Slawik Reinhard. 1992. *Software Development and Reality Construction.* Springer Verlag. Berlin.

Senge, Peter M. 1990. *The fifth discipline: The art & practice of the learning organization..* (Doubleday). ISBN: 0-385-26095-4

Suchman, Lucy. 1987. *Plans and Situated Actions – the problem of human machine communication.* Cambridge University Press. ISBN: 0521337399.

Wibeck Viktoria. 2000. Fokusgrupper. Studentlitteratur. ISBN 91-44-01060-5.

## Articles

Anderson Bob. 1996. Work Ethnography and System Design. Cambridge, UK, Rank Xerox Research Center. EPC-1996-103.

Dittrich Yvonne. 1998. How to make Sense of Software – Interpretability as an issue for Design Research Report.  Blekinge Institutet of Technology..

Gustavsson Fredrik, Lyrstedt Daniel, Wessman Björn. 2002. *Designverktyg vid spelutveckling*. Project Report. Department of Human Work Siences and Media Technology, Blekinge Institutet of Technology.

Naur Peter. 1985. *Programing as Theory Building.* Microprocessing and Microprogramming # 15, p 253-261.

Robinson M. 1991. *Computer Supported Co-operative Work: Cases and Concepts as published in Procediongs of Groupware '91.* Software Engineering Resarcg Centre, the Netherlands.

Rouse III Richard. 2000. *Designing Design Tools* (Gamasutra) http://www.gamasutra.com/features/20000323/rouse_01.htm

## Design Documents

Gustavsson Fredrik, Lyrstedt Daniel. *DRSPGW-Project: The Design Documentation.* EnOrmousgames. Version 2002-05-15

## Transcriptions and summaries

Transcription of Focus Group Discussion: Persistent online-games in general, 2002-02-20.

Summary of the  Focus Group Discussion , Persistent online-games in general, 2002-02-20.

Transcription of Workshop: From chit chat to formalized documents, 200204-25

## On-line discussion boards

On-line Forum Discussion 1. Thought regarding persistent game worlds,

GameDev.net, 2002-05-09
http://www.gamedev.net/community/forums/topic.asp?topic_id=80831

On-line Forum Discussion 2. Online game idea - politics & conquest, GameDev.net, 2002-05-09
http://www.gamedev.net/community/forums/topic.asp?topic_id=62384

## Games

*Anarchy Online*, Funcom, 2001.

*Sid Meyer's Civilization 3*, Fixaris, 2001.

*Risk*, Hasbro.