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Executive Summary

In this document we summarize the work done in Massively Multiplayer Mobile (MMM) workpackage of IPerG. During 2007 we designed, implemented, deployed, and evaluated *Mythical: The Mobile Awakening* massively multiplayer pervasive mobile phone game. The main research issue was to explore and evaluate what kinds of pervasive features work in massively multiplayer mobile phone games. More detailed descriptions of the game design, implementation, and the evaluations are found in accompanying reports. This report also includes a short analysis of business potential of MMM games.

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Abstract (for dissemination)	This report describes the results of Massively Multiplayer Mobile showcase. The showcase designed, implemented, and evaluated a massively multiplayer mobile phone game. In the game, Mythical: The Mobile Awakening (Mythical Mobile), the players use their mobile phones to control magic and magical creatures, which have always been around us.
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1 Introduction

The showcase designed, implemented, and evaluated a massively multiplayer mobile phone game. In the game, *Mythical: The Mobile Awakening (Mythical Mobile)*, the players use their mobile phones to control magic and magical creatures, which have always been around us. The world mythologies, the local folklore, and all the stories about ghosts, faeries, and other spirits are real; the new mobile technologies just happen to be the best ways to contact the spiritual worlds.

Mythical Mobile was launched for public testing 9th of November 2007 and the test was active until the end of February 2008. The client software is still available for download at www.mythicalmobile.com. About 350 people registered to the game during the test and the showcase has been presented at several seminars and conferences.

The showcase prototype turned out to be not just a game but rather a platform for creating similar types of games. The project developed easy to use content creation tools which can be made available also for the players. The public testing of the game ended in February 2008 but the platform will be used for further pervasive mobile phone game prototyping and evaluations at least in the Nokia Research Center. The game and the platform, however, will be available for all interested parties.

The showcase started in December 2006 and the following people have been working on it.

Nokia Research Center:

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Ville Nenonen (server side game programming, game design)
Hannu Korhonen (interaction design and evaluations)
Elina Ollila (evaluation guidelines)
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University of Tampere:

Timo Nummenmaa (client side programming, game design)
Jussi Kuittinen (web-components and content tools)
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Interactive Institute:

Robin Milding (server side programming, game design)
Johan Peitz (early game design)
Johan Olsson (early game design)
Staffan Björk (playtesting and design comments)

University of Nottingham:

Alastair Hampshire (server platform integration)
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Alain Becam (server side programming)

2 Goals and Background

During the past few years, there has been a phenomenon around Web 2.0, virtual worlds, social media and social networks. On the other hand, mobile communications and mobile gaming have been obvious mega trends. Mobile social gaming, even though many have referred to it as the next big thing, has not been realized at all. Given the ubiquitous nature of mobile phone, it is justified to assume that the most engaging form of social gaming in mobile should mix the real world environment to the connected mobile gaming, hence the need for pervasive elements.

The objective of the showcase was to design, develop, and deploy a massively multiplayer mobile phone game with pervasive features in order to explore and demonstrate the potential and commercial viability of the genre. The game also highlights some the archetypical pervasive game play features of multiplayer mobile phone games: support short and spontaneous play sessions, stimulate social interaction and community formation, allow activity blending, and take the game out of the small screen as much as possible.

Another objective was to evaluate the game concept and collect information about players' attitude towards pervasive games. These evaluations focused on exploring pervasive elements that are included to the game concept. There are several research questions that are related to these aspects:

1. What are the main context elements that can be included to the game concept?
2. How players perceive context elements in the game?
3. How players feel about connecting game elements in to their real world?
4. What are players' attitudes towards off-line communication from the game world?
5. How players feel about asynchronous gaming mode?
6. Are players willing to create their own content to the game?
7. What are the main motivation and incentives for creating game content?
8. Is it feasible to use both mobile and web to the social interaction?

Due to resource constraints, questions about player created content were not evaluated properly, even though the player content creation tools were implemented. These questions will be addressed in future collaboration projects using the *Mythical Mobile* platform.

3 The Game

MMM implemented one major prototype, *Mythical Mobile*, as a demonstration and research platform. The design requirements for the game were heavily influence by the previous work done in IPerG, especially Socially Adaptable Games and City as Theatre showcases. ELarp showcase was also a minor influence during the design and roll-out of the game. The design work was instructed by previous design guidelines and design kit, most notably SAG design kits. The lessons learned from designing *Mythical Mobile* contributed a lot to the *D5.10 – Design Kit: Massively Multiplayer Mobile* deliverable.

As the original intent was to provide tools for player created content the prototype ended up being more of a platform for creating certain types of massively multiplayer mobile phone games than just a game. It was decided quite early in the project that the game logic should be as much data-driven as possible to enable major changes in the gameplay by just modifying parameters in the database. More polished content tools were later implemented on the top of the integration platform.

3.1 Gameplay

The main gameplay consists of performing rituals to gain knowledge of new spells and then using these spells in encounters with the magical beings and in combat with other wizards. The rituals range from simple press button 5 on your mobile at noon to elaborate asynchronous collaborative actions where tens of players across Europe have to do their own parts of the ritual. The phase of the moon, the weather at the players' local town, the time of the day, the location of the sun and the moon, other Bluetooth enabled devices nearby, and so on affect how well the ritual parts succeed. The players use the spells gained from the rituals in slow update combat modes against other players or together with other players against the rogue magical beings.

The mobile phone part of the game has two main modes of play: Encounters and Rituals. Rituals are the players' main way to gain more spells. The ritual game mechanics are similar to buying a booster pack for a trading card game: you have to do something (pay money, perform ritual in a certain way and so on) in order to get something random back and there is an uneven distribution of the spells gained according to their value, that is, common spells are easy to get but they are also not so beneficial in the game. The rituals can be done in collaboration with other players in which case they are mainly asynchronous in nature so that the players do not have to be even online in the same time in order to complete a ritual together.

The players select the spells they want to use in an encounter before entering it and continue playing until an end condition of the instance has been fulfilled. An encounter can last from some minutes in a simple blitz version to several days in slow update encounter. Playing an encounter is similar to playing one game of a trading card game: a number of players decide to play the game, they build their decks (select spells) from their card collections, they use the cards in the deck to play with or against the other players, and there is always an end condition which ends the game, for example, that a player has gained enough points to be the winner. Up to six players can participate in one encounter. Players can compete against each other in Player versus Player (PvP) encounters or cooperate with other players against computer controlled opponents in Player versus Environment encounters.

The players gain honour points by defeating other players in PvP encounters. These honour points are used in player rankings, both local and global. Players gain experience points by completing PvE encounters and the more experience the players have more rituals and encounters are revealed to them.

The game does not have a big overarching goal for the players, rather it has a major theme, that of maintaining the Balance, which is then reflected in the progression of player vs. environment encounters. The other major intended player goals are to gain more knowledge of the available spells by completing rituals of increasing complexity, to know more what is happening in the spirit world, and to compete against other players in PvP encounters.

A more detailed game description is available in *DI3.6A – Mythical: The Mobile Awakening Game Design*.

3.2 Technological Realization

The game uses traditional client-server architecture. The thin client approach used in MUPE and Equip2 integration provided means for data-driven game logic and client side updates without patching. The main drawback was the unresponsiveness and increased data traffic

between the client and the server. Several other readily available platforms and components were used to implement the game.

The main technical platforms used are:

- MUPE – Mobile phone client.
- Equip2 – Database solution
- Scenario Engine – service that updates active encounter instances
- Ritual Engine – service that handles the playing of rituals
- Environmental Services – provides environmental data about the home bases

The Scenario Engine, Ritual Engine and Environmental Services were coded in Java and run on an Apache Tomcat application server.

The external software components used by the application are as follows:

- Acegi security framework for user authentication and authorization in the web site.
- DWR (Direct Web Remoting) for ajax-calls in web-pages.
- Graphviz for drawing the structural graphs in campaign and ritual tools.
- jForum for the user forum in the web site.
- JSON Tools for mapping Java objects to JSON (JavaScript Object Notation).
- Sitemesh for website-templating.
- Java Weather Library, jSunTimes and Sky View Café for retrieving and processing meteorological data for the environmental services. (And some from Jakarta commons? Or where they only used by jWeather? In that case I think we can skip mentioning them)

In addition to these, Equip2 uses Hibernate for object-to-relational mappings, Xalan for xsl-transformations, Tomcat as the JSP-container and finally, Spring framework as a web development framework and an IoC (Inversion of Control) container allowing for clean integration of the various technologies used.

More information about the technology can be found in *D13.6B – Mythical: The Mobile Awakening Technical Report*.

3.3 Main Results from Evaluation

There are two kinds of results from the evaluation. First, playability evaluation identified many problems in the user interface and gameplay, which were fixed during the development of the game.

The other objective of the evaluation was to find answers to six research questions that were defined at the beginning of the project.

1. What are the main context elements that can be included to the game concept?

Evaluation results indicate that the players found the time of the day as the most interesting context information in the game. Other context information found interesting, but players did not really had change to experience them as they did not progress that far in the game.

2. How players perceive context elements in the game?

Players found the game appealing and interesting because of utilization of the context information in the game. However, players also commented that context information should have been used more in the game.

Context information also brings new challenging elements to the game as the players need to find right conditions to play the game.

3. How players feel about connecting game elements in to their real world?

For some players linking real world objects or events into the game world changes their attitude towards the gaming. Previously the gameworld has been an isolated safe environment where it is safe to explore different possibilities. However, in our studies this safe environment is not anymore present as the real world items and events are included to the gameworld. As a consequence players are more cautious what they do in the gameworld because they are not sure how it affects to the real world.

4. What are players' attitudes towards offline communication from the game world?

This research question remained pretty much unanswered because players did not activate this features in the game. However, in some evaluations players mentioned that this kind of feature would be useful because of persistent game world.

5. How players feel about asynchronous gaming mode?

The players commented that this new style requires some learning and they had some troubles at least at the beginning to get used to it. Players appreciated the possibilities that this new gaming mode provided, but this requires further research on how it should be actually implemented to the games.

6. Is it feasible to utilize both mobile and web to the social interaction?

Combining web and mobile phone game did not work in this study. None of the players took part in the discussions in the Mythical Mobile web forum, and many of them didn't even realize that there is a web page that is supposed to be part of the game experience.

4 Business Analysis

The purpose of this section is to identify and organize some of the monetizing possibilities that are involved in the concept of pervasive gaming in general and IPerG Massively Mobile Showcase in particular.

4.1 Business Opportunity

Due to the nature of social media and community-based businesses, the earning logic is not straightforward. The examples of social media web communities (e.g. My Space, Facebook, LinkedIn), online game communities (World of Warcraft) and Japanese and Korean mobile MMO:s (NC Soft, Gamevil) reveal, that almost any feasible form of monetizing content has been used successfully. The models range from advertising deals (MySpace, YouTube) to transactional micro payments and monthly fees (MMO:s, mobile games) and is often a combination of many.

4.1.1 Business environment and adjacent businesses

There are still no good examples of very successful pervasive games businesses in the mobile sector, although some promising attempts have been made. By studying the adjacent businesses mentioned above, an educated estimate would be, that given an appropriate infrastructure and good game content and design, there would be a large opportunity in pervasive gaming, since it combines and adds value to the concepts of online gaming, social networking and mobile entertainment. Since the data transmitting capabilities are becoming ubiquitous, gamers are starting to demand community features. Several mobile

communication methods, such as content streaming and video messaging, will become common features of mobile games (Market Wire).

4.1.2 Market information

The combined market value of online worlds and online games was over 1 billion Euros in 2005. During 2006, referring to estimates that the research company TowerGroup Inc. has made, the market will grow to €2 billion and the market is estimated to reach a value of €8 billion by 2010 (Forbes). A research done by Juniper Research indicates that the mobile games market will grow to over 13.7 billion euros by 2011. The amount of online gaming enabled phones grows at an annual rate of 100 million sold handsets. Market-Visio predicts the increase of the use of connected mobile phone applications. During 2007, data transfers by mobile users will increase by 14 percent. The data transfer will consist of video and music streaming and communication data sending and receiving. This data transfer growth opens possibilities for new comers (Tietoviikko). Online gaming is increasing all over the world. Finnish Habbo Hotel has grown its user base each year, and had over 7 million unique users in the beginning of 2007 (Sulake). Online gaming is increasing all over the world with the most potential user growth in China, which is partly driven by Chinese governments attempt to promote their local 3G variation (TD-WCDMA).

4.1.3 Market potential

There are number of analysts' reports forecasting extremely high figures on mobile gaming market growth. However, the most optimistic figures should be critically viewed. The optimistic market forecasts are partly based on the belief, that mobile platforms attract increasing numbers of casual gamers, who are yet to be seen in the gaming market. In Europe, the future of mobile navigation and context aware applications has been seen mostly as one of sensible (business) applications, not so much entertainment. Development has been expected to be slow, as it is hampered by many socio-cultural differences. In spite of advanced standards, the development of the market will be quite seriously obstructed by the fact that Europe is culturally very heterogeneous. As the services will be predominantly content services and, thus, language specific, development will be slowed down by regionally differing practices. In this context it is worth noticing Sony's attempt to develop a language independent communications methods to its Playstation Home online community service.

4.1.4 Competition

No similar products exist in the market at this moment. The mobile multi player games are still mainly casual games with peer-to-peer option. However, since the business opportunity is such a logical one and has already been to some extent successfully tried in Korean and Japanese markets, it is probable that such competition in pervasive gaming will emerge.

4.1.5 Key selling points

The uniqueness of the service comes from the combination of mobility and blending in external information from the real environment. The service also enables contacts within very short period of time when it is most suitable for the users (context sensitivity.)

Key selling points are

- Mobility – can be used with any mobile device
- Usability – easy to use menu structures and intuitive interface
- Location Sensitivity – where the users are
- Location awareness – what is near the users
- Community building – users are engaged by communities

- Good game design and immersive gaming experience

4.2 Business Model

The dominating revenue model for mobile entertainment applications at the moment is revenue share with mobile operators, portals or aggregators. There are two major disadvantages to this. Firstly, the value chain contains multiple parties who each require their share of the end user price, which typically is 5-10€ per download. In this scheme the mobile operator has the biggest negotiation power having the billing mechanism and customer base in their possession. The supply-side of the mobile entertainment value chain is extremely cluttered, with thousands of developers push both decent and substandard content to the market. It is difficult to stand out as a single application from the masses and the time window of sales is relatively short per geographical market area.

Increasingly, however, gatekeepers are looking to reduce the number of individual agreements they have with content providers and this is opening up a role for aggregators, which can gather different titles and functions together. Currently, device manufacturers led by Nokia that are making a determined play at aggregation by embedding games in handsets and forming relationships with games developers to run games over their own platforms. It is essential to both find new, innovative and low cost ways of distributing the game (e.g. super distribution) and extending the application's lifespan by constantly offering extras, upgrades and social stickiness to the product. The value chain of pervasive information service provision may be quite long, which can easily make the earning logic quite complex. On the other hand, there are multitude of services available on the internet, but utilizing those (weather services, other regional information) require a lot of attention to the agreements concerning for example copyright issues and SLA:s.

The user can pay for a pervasive service, or the concept may be based on third party funding. Billing can be based on the duration of the event, volume of the transactions, or be a flat monthly sum irrespective of the duration of use or number of transactions. The drawback of the flat monthly fee may be a higher adoption threshold, although it may have the benefit that the user becomes used to the service faster. In long value chains, achieving a satisfactory distribution of income is always a challenge. Whereas in small markets, a 50/50 distribution can apply between the operator and the content producer, in large markets, such as Japan, the operator may have to make do with a smaller proportion, while charging for the data transmission.

It is only natural that, in offering information aggregation services, the service provider wants to get a payment in one way or another, either as direct cash flow or indirect advertising revenues. The cost of a service can be divided among more than one actor. In marketing and advertising related services, the service can be paid for by some third party, such as a restaurant chain paying the price of transmitting to a potential customer information about the company's nearest location.

The information aggregation value chain contains many components. New cooperation service clusters have emerged that utilize and develop services to provide value added to their customers. Terminal manufacturers cooperate with application developers. Telecom operators have gathered services into their portals. Network operators have sought cooperation with providers of value added services in particular to develop the marketing of network-based platform products.

Potential applications in the current market are social media services where users produce majority of the content themselves and engage each other's to the service. These include community applications that provide game and other content to the members of the community.

Next the value network will be dominated by device manufacturers, software producers and application developers, as well as actors offering integrated applications. The terminal (and thereby its producer) will occupy an important position, because it is the terminal through which services become a tangible reality.

However, services are more important than devices (if there were no useful services, what would be the point of having a device?). Applications will initially emerge with the help of device manufacturers. From the business perspective, device manufacturers, producers of gaming platform technology, and operators, will provide the driving force for development. Still, the most valuable asset, where the value is added is the user community itself. Technology is relatively easy to duplicate and the winning companies in mobile multiplayer games will be those capable of recruiting and retaining the desired community of people.

4.2.1 Value network

The companies acting on the pervasive gaming market can, by looking at the complex network of interrelationships, be said to be tangled in a mobile entertainment value network.

The games benefit multiple partners in the value network. Interestingly, at this market stage the challenge is not so much who gains most subscribers, but who can provide the most valuable content for the end users thus attracting revenues also for the other players in the market.

Having a multitude of actors involved can be used as a tool for partnering strategy. With a slightly modified message, a multiple categories of partners, customers and users may be reached.

4.2.1.1 Operators

Increased handset functionality has the potential to shift power away from the network – and, therefore, away from the network operators. It gives subscribers choice and allows them to play without being dependent on network connectivity. Operators must seek to influence developers to incorporate network usage into downloadable games – for example incremental downloads, multiplayer aspects and location services. This will allow the operators to continue to benefit from network usage and incremental revenues after the initial download.

4.2.1.2 Service providers and portals

These are responsible for developing and maintaining the interface through which mobile entertainment services are delivered to users via mobile devices. This involves the aggregation of information and services from a variety of other content providers to fulfill a variety of entertainment, communication, commerce and community building functions. Portals vary in the degree of aggregation and personalization of content, which they provide. They purchase services from content aggregators and providers (see below), as well as application providers. Many portals are developing mobile entertainment services from the operation of fixed-line internet portals (e.g., AOL, MSN), as well as the emergence of a number of start-up portals (e.g., Kiwee), MNO owned portals (e.g., Vizzavi, O2), and portals set up by device manufactures.

Operators and portals are currently pursuing to deploy next-generation wireless services that include wireless data applications, allowing users to access types of content those are new to wireless but already familiar in the online world. Wireless games are a prime example of this type of content and can be used as a vehicle to educate the users of mobile online services in an approachable way. Thus, as carriers transition to next-generation services, they will focus on creating new revenue streams by offering advanced wireless services and content as well as tapping into underserved markets, such as the youth market, in order to spur growth.

The revenues are generated mainly by charging one time fee's for game downloads. In case of multiplayer- or otherwise network enabled games; there may also be a charge per network event and/or a revenue share of airtime/packet revenues with network operator.

4.2.1.3 Advertisers and advertising agencies

For advertisers the service gives very precise reach for desired target group. There are some limited experience in promoting goods and services with and within games. The deals can be fairly difficult to settle, since there are no existing business models. A recent example of such service is a functionality in World of Warcraft online role-playing game, where user can order a pizza delivery from Pizza Hut from inside the game. With high volume consumer brands, this could be a real moneymaker.

Thus far the main obstacle in mobile marketing has been unclear regulatory environment and how the permissions to advertise are handled, what and how to market to underage children etc. In the context of a pervasive game, many of these difficulties may be easier to tackle thus opening entirely new opportunity to advertisers.

4.2.1.4 Game publishers

Over the long term, wireless games appear to offer the gaming industry a new channel through which to earn revenue. Just as importantly, this new game platform also offers the industry the ability to expand interactive games to new demographics, such as females and older users, who are not currently gamers. Many in the publisher space are also prominent in the developer space. This group often works directly with carriers to deploy content across their networks.

4.2.1.5 Media and entertainment companies

Branded games are likely to be attractive to subscribers to try out in the first place and have a greater chance of long-term success than an entirely new concept. Entertainment services with brand names attached have an immediate hook to attract users who already know and appreciate the brand. The main concern with brand owners seems to be dissatisfaction of the quality of the mobile games.

4.2.1.6 Content providers

A new aspect in the value network is the users generating content. Quality content providers could be rewarded with small share of the revenue he's game has created. This would also have a desired side effect of motivating content providers to market the game within their own social networks (attempting to attract as many gamers as possible.)

In case of user generated content a feasible licensing method should be created to avoid legal disputes, but also enabling content providers to benefit from their works fairly. Some variant of Creative Commons license may be utilized to handle this.

4.2.1.7 Device manufacturers

The interest in mobile phone manufacturers is to increase average price per unit. Higher-end devices, currently retailing at 200€ or higher will appeal to gamers who want to play games to their handsets.

Ultimately, the gaming experience is delivered to the handset platform - the physical form factor that a user can touch and feel. Since a satisfactory user gaming experience will be one factor in reducing churn for wireless carriers, it will further cement the relationship between handset manufacturers and wireless carriers. This is particularly true when the trend with the biggest mobile operators is to rely heavily on custom made handsets.

4.2.2 Business Case

The business case should be decided upon evaluating the capabilities of the company and prioritizing the earning models.

4.2.2.1 Platform sales and licensing

Licensing the software platform as such is the most straightforward way to make business with the application. For one time, monthly or yearly fee the customer gets the platform technology and runs and maintains the service themselves. Platform sales can be complemented with integration and customization services. Also a monthly maintenance fee is commonly used. Also an ASP-model can be used.

The benefit of licensing the software is the predictability of cash flow for the vendor. The price of the SW license should be determined by the added value to the customer. The components to be taken into account:

- number of users
- number of transactions
- price of an individual transaction

It may be quite difficult to determine the final price for the license, since the concept is entirely new and no statistics from the past exist. One starting point could be the development costs of the system.

Also it should be noted, that typically in platform licensing sales, especially in the telecoms sector, the sales cycles can be very long and require a lot of effort from the vendor before the actual cash flow starts. Also the platform is likely to be imitated at least in the conceptual level and the company's competitive advantages in platform development should be assessed.

4.2.2.2 Revenue sharing

Sharing the revenue between the vendor and the service provider is perhaps the most common method in mobile services field. It makes it easy for the service provider to try out new services, since the initial costs may be low or even zero. However it is advised that the vendor sets up some kind of threshold or minimum monthly fee for the services. This encourages the service provider to actually promote the service. Setting the revenue share is relatively easy and is up to negotiation. The customer needs to recoup the marketing costs and vendor their operational costs. The downside is that in this case the vendor is fully responsible of funding the product development.

4.2.2.3 Advertising and marketing

There are at least 4 different approaches to develop marketing revenue from the pervasive game:

- utilizing meeting places in the game scenarios
- sponsoring and/or creating sponsored game content
- sponsoring game clans
- embedding in game advertising

In the application it is possible to determine or suggest the meeting places in the service (meeting location). Having the basic demographic information and location of the users give a powerful possibility to do very targeted advertising for the meeting places.

The advertiser does not necessarily pay for the entire service, only part of it, as a sponsor. There are essentially 3 motivations:

- get themselves added to the database (pizzerias, gyms, etc.) by sponsoring searches this is relatively feasible. Optimal solution would be to sell the concept to the chain of service points (restaurants, café's etc.) to get a good coverage with a single deal. Selling to individual "shopkeepers" may be too difficult compared to the benefits. Also this service is more attractive to the customer, if the volumes grow high enough.
- pay per visibility (each recommendation by application) In theory this would be the most "fair" way to charge. However, the price expectation of individual "click trough" (due to web banner advertising) is so low, it is unlikely this would generate enough revenue compared to the costs of running, calculating and billing for the service.
- have the service as a part of bigger advertising campaign (web- and WAP-banners etc.) This requires a partner who does advertising for these customers in advertisers point of view this makes the most sense. The most likely demographic group of users (20/30-somethings) is complementing the interest of marketing partners such as restaurants or cafe's as the said group has a tendency to use money in such services. In this case the challenge is low initial volumes. It may be needed to offer this service for piloting marketing partners in a very low starting price to prove the concept.

4.2.2.4 End user charging

Billing end user requires running the whole system and the support structure that comes with it. End user billing falls into 3 categories

- charging transaction price for the end user application downloads
- charging transaction price for the in game events
- charging monthly fee for the usage of the game

Transactional pricing could be for example purchasing items from the game. If the player wishes to advance in the game to a higher level, he is encouraged to purchase "power items" which would be charged for example in the phone bill.

5 Post Mortem

5.1 What went right?

Code Camps

The money spent on travels and hotels for the so-called "code camps" were well worth it, since time was short and the code camps allowed key parts of the technical things to be quickly implemented/integrated so that the developers could then build on this when working on their respective parts.

Dedicated and highly skilled team

The team members were dedicated for delivering the showcase in time and the team skill level was high. The communication and team work went surprisingly smoothly considering the highly distributed nature of the team. Though the team was distributed, we had some resource problems, and the goals were ambitious the project was well managed. Nothing was left at random, and all partners knew what to do. The project manager and the technical lead have been present constantly during the whole project, and available to anyone, thus ensuring a good team work.

Right choice of technical platforms

MUPE and Web Application Framework (Equip2 and the associated tools) were chosen in early phase as the main platforms. The platform integration was easier than expected and they provided us with easy semi-automatic authoring tools and no need for client-side updates. In retrospect, the integration of several components from different partners of IPerG was essential for delivering the showcase in time.

5.2 What went wrong?

Distributed development

Even though the distributed development was born out of necessity and worked as smoothly as it did, there was a noticeable increase in productivity that occurred when the developers where gathered in one room, just because of the ease of communication. Also, there are nuances to a game design that people get different impressions about trough simple misunderstandings, but that are quickly straightened out when people "small talk" about the game.

Way too ambitious goals

Right from the beginning it was clear that the game concept was complex, especially considering that it needed elaborate support and player tools. Many people, including professional designers and producers from the industry, warned about this but the project lead still decided to go for it. On the technical aspect, the final solution is a rather big server application. Though the team was well experienced with Java, some aspects were rather new to us. This was made clear for the memory management, with a memory scheme adapted to client application, and one sub-part literally squeezed. It is not uncommon that memory problems are tedious to fix, but we also underestimated the issue, and the fragility of some elements. One simple issue is simply linked to the nature of the project. The concept is original and it has been done quickly, and for that purpose we used a great number of APIs, some still being experimental. It would have been impossible to do otherwise. It is noticeable that parts of the solution should be entirely rewritten, and redesigned, to ensure a stable release.

Resource problems

Many, including one key technical person, left in different phases of the project causing considerable difficulties in reaching internal milestones. The right way to deal with this issue would have been to simplify the game considerably already in the design phase but it was also evident that "cutting to the core" would have resulted in a different game which would not have met some of the ambitious design and research goals of the project. One main problem was that there was no dedicated creative lead in the project. This resulted in game content that was not polished enough for public testing of the prototype. However, in the end we managed

to deploy a somewhat working game on a top of a platform which is highly versatile and usable outside the project.

6 Conclusion

The main objective of the showcase was to demonstrate and evaluate how to use pervasive features in a massively multiplayer mobile phone game. The main research questions, apart from the player created content related ones, were adequately addressed in the prototype evaluations. Quite many players tried the game but in the end it did not reach a self-sustainable critical mass of players. This fact limited the relevance of the ancillary research questions concerning the formation of local and global game communities. Fortunately, the game provides a platform for further research and hopefully these remaining research issues will be solved in subsequent projects. There is already one official project at Nokia Research Center, which is using *Mythical Mobile* as a research platform for experimenting with player created content and the formation of mobile game communities. Most of the results of this project will be made public during year 2008 and will credit IPerG for providing the background research and the platform.

The showcase was based on work done in other IPerG workpackages. The major influences for the design were Socially Adaptable Games and City as Theatre showcases and, of course, guidelines and design kit provided by Design and Evaluation workpackage. The knowledge gained from the showcase had a major impact on *D5.10 – Design Kit: Massively Multiplayer Mobile* deliverable. Web Application Framework from University of Nottingham and Multi-User Publishing Environment from Nokia Research Center were integrated for the main technical platform. The integrated platform proved to be crucial for successfully finishing the development.

6.1 Business

One of the most important and mostly unresolved issue in mobile game design in general and pervasive gaming in particular is the exploitation of the network capabilities in the mobile phones. Game-playing hype is often based around the potential data rates of 3G networks. However, the figures given are generally optimal rates, and actual performance will be substantially lower than what is being quoted. In reality, network latency will not go away, at least not until 3G reaches mass-market penetration and affordability. This will affect the potential of multiplayer games, since a dropped connection or slow speeds on the move will quickly alienate users in an immersive game. In this sense a good game design plays a crucial role.

There is an emerging market for the product, as the comparable examples in social media and online gaming. This will require well-planned channel strategy and a decision whether to concentrate on the platform development, content production or both. So far the inhibitor of this type of services has been lack of a proper infrastructure, both in networks and end user devices.

The biggest challenge for rolling out this service is the low initial number of users and transactions. It will take some time until this service will generate enough usage for all stakeholders to be satisfied. In this sense a partner with access to large audiences of users, such as Media Company, would be a valuable asset.

7 References

Korhonen, H., Saarenpää, H., Paavilainen, J., (forthcoming): Player Perception of Context Information in Pervasive Games – Implications for Mobile Game Design. In MobileHCI 2008, September 2–5, 2008, Amsterdam, the Netherlands.

Appendix A: Publications

7.1 Reports

The following related reports are available at www.iperg.org.

D13.4 – Mythical: The Mobile Awakening Prototype Deliverable

The prototype has been available for public testing since 9th of November 2007 at www.mythicalmobile.com. The mobile client is available for free download at the site.

D13.5 – Mythical: The Mobile Awakening Evaluation Report

The evaluation process and the main results are reported in this document. The implications of the results for the design of massively multiplayer pervasive mobile games are briefly discussed.

D13.6A – Mythical: The Mobile Awakening Game Design

This document gives a brief overview of the main game design features of *Mythical Mobile*. The main focus is to give the reader adequate understanding of the game based on the research and design objectives of the showcase.

D13.6B – Mythical: The Mobile Awakening Technical Report

The report gives an overview of the technical platform and the various platforms and modules used in the system. The report also contains instructions for installing and modifying the system.

D13.6C – Mythical: The Mobile Awakening Interaction Design

The interaction design of *Mythical Mobile* changed a lot and often during the development. This document outlines the final interaction design and has brief comments on its history.

7.2 Software

Mythical Mobile has been up and running at www.mythicalmobile.com since 9th of November 2007. The whole software package, including the server code, is available for download at www.iperg.org.

7.3 Publications

Korhonen, H., Saarenpää, H., Paavilainen, J., (forthcoming): Player Perception of Context Information in Pervasive Games – Implications for Mobile Game Design. In *MobileHCI 2008*, September 2–5, 2008, Amsterdam, the Netherlands.

7.4 Seminars and Workshops

The game has been presented at:

1. IPerG Open House, Brighton, 19th of September 2007
2. MindTrek 2007, Tampere, 3rd of October 2007, (<http://www.mindtrek.org/>)
3. MobileMonday, Helsinki, 5th of November 2007
4. Nokia User Experience Day, Helsinki, 24th of January 2008

