Experience Report
‘Offshore XP for PDA development’

Sergei Andrzeevski
Project Manager in StarSoft Development Labs
E-mail: sa@starsoftlabs.com

Abstract

One day our customer, a famous chip producer, suggested a project which was very unusual for us. We had to develop a system with PDA client using C#, Microsoft Compact .NET library and SQL CE. Application data was stored in a huge third-party master database with hundreds of tables.

We had never worked with PDAs before and our customer itself was not sure about the whole idea. To complicate things further, we were living in a different continent from our customers. We cautiously started with a two week technology spike using Extreme Programming.

This experience report describes the challenges we faced applying XP to offshore development and how we overcame those challenges to deliver a successful product to our customers.

1. Introduction

One of our first XP projects was a very interesting and successful project from the famous world leader in microprocessors' production.

Customer ordered solution with PDA client written in C# language. We had to use the just appeared Compact .NET and Microsoft SQL CE, which was unknown for us. Team had big experience in C#/NET/SQL development for desktops but PDA was completely new area for us therefore Extreme Programming methodology was very appropriate. To reduce risks customer decided to start the project from 1 week pilot iteration just to make sure we could develop and estimate correctly in case of PDA platform.

At first, when we got customer requirements for possible new PDA project we were slightly nervous. We never worked with PDA before and Compact version of Microsoft .NET had just appeared. We had no idea about performance of software running on PDA, restrictions of Microsoft SQL CE and time required for client-server synchronization via cradle. On the other hand it was very interesting for us to try new technologies with unusual hardware. After some hesitations we decided to start this project hoping that strong team experience, agile methodology and our fascination to work with the latest software/hardware would help us to overcome all difficulties.

Finally this project turned out to be very successful and until now when customer visits us with colleagues from other departments it always asks us to tell the story of this project as a good sample of XP success.

2. Project background

Project objective was to develop a client PDA application and Middleware Server to create a system for handling periodical equipment checks and work orders at client’s manufacturing facilities located worldwide.

PDA was a new hardware for customer and development team and the project itself was rather innovative. Client application had to be written by using recently appeared PDA version of .NET Framework library which increased uncertainty. Because of these reasons XP methodology was selected to allow flexibility and requirements definition during the development.

Some parameters of this XP project:
- Team size & composition: 7 (PM, Tech Lead, Test Lead, 3 developers & 1 tester)
- Total effort: 1000 man days
- Product size: 50K lines of code
- Technologies used: XP (Extreme Programming), C#, Web Services, .NET, Compact .NET, SQL 2000 and SQL Server CE 2.0
- Automated Tools for PDA software testing: Test Suit 2.0
- Hardware used for client: PDA Dell Axim X5 with OS Pocket PC 2003

Figure 1. Screenshot of PDA client application
3. Offshore XP challenges

Generally from the very beginning we tried to apply all ideas and approaches of XP because we believed partial solution would not be enough to obtain required quality of the product. However on this way we met some challenges in the following areas:

- Planning Game with the remote customer
- Everyday communication with the remote customer
- Daily Deployment on customer site
- Daily feedback from customer
- XP documentation when customer is not onboard
- Project status tracking & reporting to customer

Our ways to overcome difficulties in application of XP to offshore mode are listed below.

3.1. Challenge: Planning Game with the remote customer

Description. Correct Planning Game is a very important component of XP methodology for accurate understanding of functionality and valid estimation. Ideally customer should be on board. However in case of remote customer the Planning Game has some specific features.

Solution:

1. Customer visits for Face to Face (F2F) Planning Games.
2. Planning Games with the whole team on customer site.
3. Planning Games with customer on the phone plus special tools like Microsoft Net Meeting for demonstrations.
4. Key role of team project manager in translation and explanation.

Rationale & details:

1. Customer visits for Face to Face (F2F) Planning Games were very useful and almost necessary. Sometimes we had Planning Games with customer on the phone but direct communication between development team and business requirements owners was much more productive and profitable for customer because it helped to understand the requirements better by the team, caused more optimistic iteration estimation and less rework during the iteration.
2. Planning Games with the whole team on customer site were also very useful. Team could communicate with customer directly, looked at real customer business and technical processes and worked with the system deployed on production environment. Logistic expenses for this option were higher than customer invitation because number of team members was greater than number of customer business requirements’ owners therefore we used this option less frequently.

3. When it was difficult to arrange F2F Planning Game we used phone communication with customer plus special tools like Microsoft Net Meeting for demonstrations. Such tools helped with business requirements clarification a lot. Finally for the long term XP project we developed the following optimal approach for the Planning Games location: during one Planning Game the customer visited team, during the next Planning Game the team had the customer available by phone, then we had Planning Game with team or at least team cure (project manager, technical lead and test lead) visiting customer site and so on.
4. In our case of different team and customer native languages role of team project manager as a translator and communicator during the Planning Game was extremely important especially for Planning Game provided by phone. After every User Story’s description or important details provided by customer project manager took a pause to translate information from customer because understanding of English language in phone conference mode was a challenge for some team members.

3.2. Challenge: Everyday communication with Customer

Description. Communication in general and communication with customer specifically is very important for success of XP project. Ideally customer or customer representative should work together with development team. However for offshore development mode it was difficult and expensive to arrange the same.

Solution:

1. Every day work as a tiny project.
2. Team project manager as a single point of all communications.
3. Daily phone conferences with customer.
4. Preparation of phone conferences minutes by team project manager.
5. Shared bugs and change requests database.
6. Team buildings.

Rationale & details:

1. We believed that well defined and regular actions of development team members and customer would improve synchronization between two teams, communication flow and overall control. To introduce strict regularity and fast movement forward we organized every day as a tiny project. In the morning we defined tasks for the day using team standup meeting, during the first half of a day we start implementation, in the midday we had phone conference with customer to get required
clarifications and then spent second half of the day to finish implementation of functionality planned for the day. In the evening developers prepared delivery candidate for testers, testers checked it while developers were fixing the bugs found and finally on testers’ approval project manager sent delivery to customer. In turn customer deployed the version and next day could provide feedback about the new functionality. We called this approach ‘XP day as a project’ and believe it is extremely efficient.

2. We decided to optimize communication flow between team and remote customer reducing overhead and possible misunderstanding connected with language barrier. Finally we found that the best option would be assignment of team project manager as a single point of all communications between development and customer teams. Sure this person should have good communication and language skills. In this case customer is not spammed by numerous questions from the team and vice versa project manager filters unnecessary information from the customer. In case of language barrier between customer and team such communication topology significantly reduces misunderstanding and overhead of information flow. In rare cases team Technical Lead communicated with customer technical specialists directly to discuss low-level technical issues.

3. We afraid that communication between team and remote customer will not be good enough for Extreme Programming project where ideally customer should be on board. To reduce communication restrictions we had daily phone conferences between project manager and customer. It is preferable to arrange phone conferences in the middle of the development team work day. Often questions do not appear until developers start implementation of specific functionality. Developers used first half of a day for gathering actual questions connected with current functionality under development and spent second half of a day for implementation of answers provided by customer during the midday phone conference.

4. At first customer wrote minutes after daily phone conferences but we found that information was not always clear for development team and minutes contained points more important for customer than for developers. Finally we decided that team project manager was responsible for preparation of minutes in customer language after every daily phone conference. Project manager sent minutes to all participants and the development team members. Additionally straight after phone conference project manager gathered team for second daily standup meeting to pass quickly customer answers and feedback in team native language. By writing the minutes we had documented all business requirements amendments, change requests, bugs found by customer and other results of our conversations.

5. In case of remote customer issuing of bugs and change requests and following tracking of their status via e-mail was very slowly. Finally we arranged bugs and change requests database with Internet access shared between the team and customers. Customers had possibility to create issues and track their status online. This speeded up significantly procession of bugs and change requests.

6. We believe that good team spirit and friendly relations between team and customer is very important for agile project success. In our situation with the remote customer we found different team building events very useful for better communication and high team spirit. If team works without visible customer for many months motivation becomes lower, team velocity and quality are deteriorating. Time of time we met with customer to play bowling, drink some beer, visit Saint-Petersburg’s museums or suburbs and this really helped a lot to support productive co-work.

7. For classical projects we often had situation when team was waiting for answer from customer one week or longer. We understood that such situation was unacceptable for Extreme Programming project. From the very beginning customer agreed to answer questions ASAP or at least during the business day. Fast reply on questions from the development team was very important to keep good Team Velocity and to avoid waste of time or rework.

3.3. Challenge: Deployment on customer site

Description. XP development process requires frequent deployment of the latest version available for customer to have feedback ASAP. Also it is better to test system on customer environment which is usually closer to production in comparison with the development team environment.

Solution:

1. Daily delivery and daily deployment on customer site during the whole project.
2. Customer dedicated a special technical person responsible for deployment of daily version.
3. Encrypted sources transfer.
4. Version check between system components.
5. Reasonable process for daily delivery candidate preparation was defined.

Rationale & details:

1. Because time pressure was high, we expected many change requests during the development. We were also aware about differences between our software/hardware environment and customer configuration so we decided to use daily deployment on customer site from the very beginning.
2. Managers on customer site did not have enough experience and technical skills to deploy complex
system under development. Therefore customer dedicated a special technical person called Enabler responsible for deployment of daily version on customer site, security and other technical issues.

3. Due to offshore customer it was important to guarantee secured transfer of sources from the development team to the Enabler. We used e-mails with attached zipped files encrypted by PGP.

4. Because system under development was really complex and contained SQL DB Server, Middleware Server and PDA client sometimes we had problems with incompatible versions of the above system components due of deployment issues. To detect this situation we included into the sources version check functionality to make sure at run-time all components had matching version.

5. We had to send daily delivery stable enough for customer review, testing and feedback. That’s why we defined the following process of delivery preparation. Every evening developers prepared delivery candidate and informed testers about this. In turn testers checked the version, informed developers about bugs found and developers fixed minor bugs immediately. In case of major issues or unfinished functionality developers disabled correspondent parts of application or project manager mentioned this in the delivery notes. If testers believed delivery candidate was good enough they informed project manager about delivery readiness.

3.4. Challenge: Daily feedback from customer

Description. XP development process requires fast feedback from customer for recently implemented functionality. Change request ordered next day after some feature implementation needs several times less effort than the same change request issued for example one month later because in the second case overhead to remember already forgotten functionality and implementation details is significant.

Solution:

1. Daily phone conference with customer.
2. Team standup meeting immediately after the phone conference.
3. Daily e-mail reporting to customer.

Rationale & details:

1. We found that e-mail communication is not as efficient and fast as phone conversations. Therefore every day project manager discussed current issues with customer representatives using application screenshots and special presentation sharing tools if necessary.
2. It was necessary to inform team about the latest news from customer the sooner the better because team could continue work in a wrong direction or

3. team was waiting customer answers. That’s why we found second daily standup meeting straight after the phone conference to be very useful. During this meeting project manager worked as a filter between customer and team which saved time significantly comparing with option when the whole team takes part in phone conference.

3. Every evening project manager sent e-mail to customer with project status to inform which User Stories are ready for customer review and testing. So customer had information about functionality to be checked.

4. Often customer reported a bug for User Story which was not tested yet. On the other hand sometimes customer found a bug in already tested User Story which was really missed by team testers. To avoid duplicated work and probability of important bug missing we defined the following approach. In the delivery notes project manager described which User Stories were ready for review and which User Stories were ready for testing. ‘Ready for review’ means developers have finished implementation of specific Story and customer can check it but testing of the Story is unfinished yet. If customer sees some bugs it is not reasonable to report them because functionality is untested and customer should not perform job of the development team testers. If User Story is ‘ready for testing’ this means both developers and testers finished the story and any bug found by the customer should be reported because team testers have it missed or it is specific for customer environment.

3.5. Challenge: XP documentation

Description. XP documentation is different from classical software requirements. In case of a remote customer good requirements are especially important for correct estimation during the Planning Game, fast development and minimization of change requests.

Solution:

1. We asked customer to prepare three types of XP documentation for every new iteration Planning Game. User Stories: just a brief description of some relatively independent application functionality as black box from user point of view. Story Tests: brief step by step scenario of user actions which clarify User Story functionality. Mockups: screenshots of the existing prototype or draft design prepared by customer usually in Microsoft Excel which clarifies User Story functionality. Screenshots from PDA client turned out to be extremely useful part of XP documentation.
2. Assignment of customer as the owner of XP documentation responsible for its update.
3. We asked customer to send us XP documentation 1-2 days before the Planning Game.
Rationale & details:

1. XP documentation is really different from specifications of classical waterfall project and sometimes we spent additional time to explain customer which requirements we needed.
2. Frequent change requests are typical for XP project therefore without permanent update of documentation it becomes obsolete very quickly. We asked customer to update User Stories, Story Tests and Mockups in accordance with our decisions made during the Planning Game, phone conferences or e-mail communication. We believe it is better to have this activity supported by customer instead of team project manager because customer is the owner of all business requirements and therefore can modify documentation better. Update of the requirements by customer in case of several customers for different User Stories reduces synchronization issues also.
3. Sending of the XP requirements to the team slightly in advance - one or two days before the Planning Game was very useful because team could analyze requirements carefully and prepare questions. This simple rule was very profitable for customer because in this case estimation was usually more optimistic.

3.6. Challenge: Project status tracking & reporting to customer

Description. Usually in XP project User Stories are located on the walls where developers mark tasks status. Generally XP is rather informal and it is not focused on specific tools and strict measurements.

However we had a remote customer who requested detailed daily reporting about project status and User Stories’ completeness. Customer also wanted accurate estimation in perfect hours of done work, work to do, scope of change requests and statistical prediction of project deadline based on average team velocity for passed days.

Solution:

We moved from story wall and Microsoft Excel spreadsheet to a special client-server application.

Rationale & details:

We passed a long way of evolution for our XP project tracking/management tool which was being improved step by step. At first we created in Microsoft Excel a spreadsheet with correspondent formulas and charts but later wrote a program called X-Man (eXtreme Manager) to support team work, better usability, strict validation of user input and features impossible in Excel. To keep convenient option of custom reports preparation in Excel we added to X-Man export to Excel for all tables and charts.

Figure 2. Excel spreadsheet for XP project tracking

Figure 3. Tool X-Man for XP project tracking

4. Conclusion

Even without customer on board typical for offshore projects it is possible to make successful XP project but customization of some XP rules is required.

The main findings of this project were the following:

- Extreme Programming methodology allows fast introduction and correct estimations for unclear areas (PDA development in our case) with minimum risk
- In case of offshore customer some Extreme Programming approaches does need intelligent customization but the whole methodology works well even without customer on board
- Practical usage of Extreme Programming needs some alignment of XP with business process of specific development company and customer
- In case of remote customer specific managements tools are required to let customer see XP project status and completeness of User Stories which speeds up feedback; just cards is not enough

Figure 4. People are using the program on customer site

5. Acknowledgement

I would like to thank Naresh Jain, Software Craftsman at ThoughtWorks, for helping me prepare this experience report.

6. References


7. About author

Sergei Andrzeevski graduated from faculty of Physics of Saint-Petersburg State University (Russia) in 1988. Later he worked as developer, senior developer and project manager. Last 4 years he was working as project manager doing XP project for offshore customers. He speaks English fluently.

Author of a big article in Russian newspaper ‘IT-News’ about XP: [http://itnews.finestreet.ru/mgz/?id=136](http://itnews.finestreet.ru/mgz/?id=136)


Published in Internet an experience report about XP pair programming: [www.offshoreagile.com/resources/experiencereports/andrzeevski-pairprogramming](http://www.offshoreagile.com/resources/experiencereports/andrzeevski-pairprogramming)

Made reports about XP for “Saint-Petersburg .NET Developers Group”: [www.russia-software.com/?page=newsview&t=release&id1=1581](http://www.russia-software.com/?page=newsview&t=release&id1=1581)

Author and main developer of freeware program for XP projects management called ‘eXtreme Manager’ (X-Man): [www.offshoreagile.com/resources/toolbox](http://www.offshoreagile.com/resources/toolbox)