

FRUCT Laboratory at PetrSU: Organization and Results

Anatoly V. Voronin, Sergey I. Balandin, Yury A. Bogoyavlenskiy,
Kirill A. Kulakov, Dmitry G. Korzun, Anton I. Shabaev

Petrozavodsk State University
Department of Computer Science



Maemo 2 conference, March 25, 2010

Roadmap

- 1 Software Engineering
- 2 Open Platforms
- 3 Maemo and Mobile Development
- 4 Conclusions



SE Education at PetrSU

Basic educational lines at Faculty of Mathematics

- Applied Mathematics and Computer Science (1993)
- Information Systems (2001)

Curriculum

- Specialist (5 years), Bachelor+Master (4+2 years)
- ACM Computing Curricula (1991, 2001, 2005)
- University of Helsinki: Common Core of Working Study Program (since 2001)
- FRUCT program:
Mobile Programming (since 2008)

Student team projects: Initial (2003–2004)

- Scientific-centric project *Web-SynDic*,
<http://websyndic.cs.karelia.ru/>
- Joint project *DaCoPan*
(with University of Helsinki),
<http://dacopan.cs.karelia.ru/>

Web-SynDic system

Inputs:
 $x1 = x2 = 2x1 + 3x2$
 $x3 = x4 = x1 + 2x2 + x3$

Solutions:
 $x1 = (1, 0, 0, 0)$
 $x2 = (0, 0, 1, 0)$

Timeline:
 Start: 07/07/2003
 Requirement analysis: Jul - Aug 2003
 Design: Sep - Nov 2003
 Implementation: Nov - Dec 2003
 Testing: Dec 2003 - Jan 2004
 1st working version: Mar 2004
 Release: 2005 - 2007 2004

Department of Computer Science 27

DaCoPan Project

Timeline:
 Worktime: 22 days
 1 day of collaboration work
 Implementation: 13 months work
 Finish: 11/03/2004
 Start: 09/02/2004

Documentation: 15 documents, 220 pages
 2003 - 2004: 200 pages
 Future - 2005: 200 pages
 Test plan - 2004: 200 pages
 Integration testing - 2004: 200 pages

International team

Web site:
<http://www.dacopan.karelia.ru/>
<http://www.dacopan.karelia.ru/>

Department of Computer Science



The Base Scheme of SE Education

Introduction: at school, then 1st&2nd year students

- Linux environment, open source
- SE elements in basic IT courses
- Specialization areas and optional courses
- PetrSU Programmer Club

```
Starting RPC portmap daemon
Master Resource Control: rwallwel 3 has been

Rescue login: root
Rescue: # mkdir /tmp/sdb1
Rescue: # mount /dev/sdb1 /tmp/sdb1 -o ro
Rescue: # insmod /tmp/sdb1/r12.ko
Rescue: # mount /tmp/sdb1
Rescue: # ifconfig eth0 192.168.112.201 netmask 255.255.0
Rescue: # ping 192.168.112.213
PING 192.168.112.213 (192.168.112.213) 56(84) bytes of data:
64 bytes from 192.168.112.213: icmp_seq=1 ttl=64 time=2.43 ms
64 bytes from 192.168.112.213: icmp_seq=2 ttl=64 time=0.714 ms
64 bytes from 192.168.112.213: icmp_seq=3 ttl=64 time=0.900 ms

--- 192.168.112.213 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2002ms
rtt min/avg/max/ndev = 0.714/1.352/2.435/0.770 ms
Rescue: # _
```

Basics: 3rd year students

- Mandatory course *Software Engineering*
- Autumn semester: theory + miniprojects
- Spring semester: team projects close to real life

Opening a door to real-life projects: BSc, Diploma and MSc thesis

- Participation in research & development
- PetrSU IT Park
- Regional Center of Information Technology



Regular Student SE Projects (since 2003/04), Spring

Teams of 3–6 developers (students)

- Rules of the play
- Manager (a student)
- 15 (wo)man-hours per week, 15 weeks

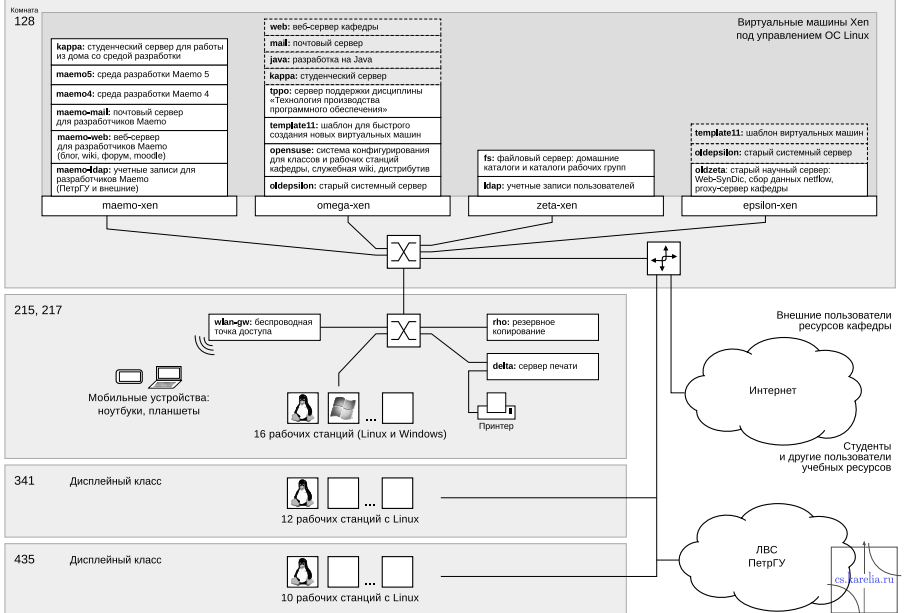
Customer

- Faculty, IT park, Industry
- Software requirements
- Attestation

Instructor

- Balancing: education and product
- Progress monitoring, advising, and controlling
- Grading





PetrSU and FRUCT Program

- Russian Community *Open platforms for mobile devices*
- Maemo programming
- Smart Spaces
- Symbian programming

University specifics

- Developing study resources
- Training: Aug.2008 (PetrSU), Feb. 2009 (PetrSU), Apr. 2009 (FRUCT5, SUAI), Sep. 2009 (Nizhniy Novgorod), Feb. 2010 (PetrSU)
- Running close-to-real SE projects
- Focusing on R&D issues
- Incubating developers and experts for industry-level projects (e.g., at PetrSU IT park)



Russian Community *Open platforms for mobile devices*

<http://oss.fruct.org>

Content synergy: Education+SE projects

- The All-Russian forum for developers
- Ideas, experience, and software from everyone
- Study materials and tech. docs
- Support for SE projects



Maemo programming

Intensive courses (1...6 days)
semester course:

- Summer school, Aug.2008 (PetrSU)
- Winter school, Feb. 2009 (PetrSU)
- Training Apr. 2009 (FRUCT5, SUAI)
- Sep. 2009 (Nizhniy Novgorod)
- Feb. 2010 (PetrSU, Qt)

Computational environment:

- Terminal server with SDK
- Web-server to access study materials (Moodle)
- SVN, Mercurial, Git for project repositories
- Wiki for students/developers

The screenshot shows a Moodle course page with the following content:

- Header:** Открытые платформы для мобильных устройств. Новости | 0 ресурсов | Вики-разработки | Форум | Регистрация
- Navigation:** Главная, Новости сайта, Страница
- Calendar:** Октябрь 2009. Days: Пн, Вт, Ср, Чт, Пт, Сб, Вс. Dates: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31.
- Course List:**
 - Доступные курсы:**
 - Maemo hands-on training in FRUCT center:** Материалы выездного тренинга в образовательном центре FRUCT, 27-28 января 2009.
 - Путешествие по платформе Maemo:** Обучающий курс по разработке приложений для платформы Maemo.
 - Занятия цикла «Мобильные станции» 2009:** Рязань, Филиппов Дмитрий.
 - Личные занятия «Мобильные станции» 2009:** Рязань, Сыркин Александр.
- Footer:** Информационная служба | Петрозаводский государственный университет | кафедра Информатики и компьютерных систем | 2009



Modifications to the Curriculum

Semester	Course
First year	
1	Introduction to C programming Introduction to Shell
2	C++ and Data Structures IA-32 Architecture with GAS Assembler Elements User Interface Design with GTK/Qt
Second year	
3	Computer Networks UNIX Programming Introduction to Java Programming
4	Operating Systems Maemo Programming
Third year	
5	Software Engineering Symbian Programming



Extending regular student SE projects (FRUCT)

Organization

- Instructor integrates some manager functions
- Mixed teams: 1st – 6th year students
- 18–20 (wo)man-hours per week (15 for regular projects)
- Possibility of personal study plans for students
- Regular all-project seminars

Student mastering phases

- Autumn semester (3rd year): a miniproject
- Spring semester (3rd year): students are included into ongoing projects (or new projects appear)
- Summer (Jul&Aug): Labs at IT-park, continuation of the project, a demo-prototype is produced
- Autumn/Spring: 4th year students test and debug, project publication



Ongoing Maemo SE Projects: First Wave

- **MySocials:** A Maemo Client for VKontakte Social Network
wiki: <http://oss.fruct.org/wiki/Maemo-VKontakte>
source code: <http://gitorious.org/mysocials>
- **Kimi:** A Personal Organizer in the Internet Event Space
wiki: <http://oss.fruct.org/wiki/Maemo-Google>
source code: <http://gitorious.org/kimi>
- **Scribo:** A Maemo Client for LiveJournal
wiki: <http://oss.fruct.org/wiki/Maemo-Blogs>
source code: <http://gitorious.org/scribo-client>
- **MobileTrade:** A Maemo Client for Web Services of Trading/Auction Business Systems
wiki: <http://oss.fruct.org/wiki/Maemo-Business>
source code: <http://gitorious.org/mobile-trade>

Bugzilla: <http://oss.fruct.org/bugzilla/>



Iterations

- Iteration 0:** Aug.-Dec. 2008, Summer school, Autumn semester
What is maemo?
- Iteration I:** Feb.-May. 2009, Spring semester, 5th FRUCT Seminar
Test implementation of the ideas
- Iteration II.A:** Jul/Aug. 2009, Summer Labs at IT-Park
Architecture and scenario engineering
Demo prototypes for Maemo 4 and Nokia N8xx
- Iteration II.B:** Sep.-Dec. 2009, Autumn semester, 6th FRUCT Seminar
Testing and debugging
- Iteration III:** 2010, Spring and Autumn semesters
Project experimentation and publication
Moving to Maemo 5, prepare to Maemo 6



Ongoing Maemo SE Projects: Second Wave

- **MySocials-Testing:** All-round Testing of MySocials Project
wiki: <http://oss.fruct.org/wiki/MySocials-Testing>
- **Scribo-Testing:** All-round Testing of Scribo Project
wiki: <http://oss.fruct.org/wiki/Maemo-Blogs-Testing>
- **M3-Weather:** A Weather Client for Smart-M3 Platform
wiki: <http://oss.fruct.org/wiki/M3-Weather>
- **Sensors:** An Application for Using Sensors in Funny Drawing
wiki: <http://oss.fruct.org/wiki/Sensors>



Research project on Smart-M3 platform development

SmartSlog: PetrSU ANSI C Library Generator for Smart Space Ontology

<http://sourceforge.net/projects/smartslog/>

- Mapping an OWL ontology description to ANSI C code (ontology library)
- API for programming Smart-M3 agents
 - ▶ knowledge processors, KP
 - ▶ in high-level terms of ontology entities
 - ▶ instead of low-level triplet-based terms
- The Smart-M3 platform is being developed by
 - ▶ Artemis JU programme in Sofia (smart objects for intelligent applications)
 - ▶ Finnish national DIEM (Device interoperability ecosystem) research projects



Features

- Unification of similar parts in projects
- Weekly interproject seminars
- Usecase scenarios in designing
- Local data storage (SQLite or RDF)
- Coding style
 - ▶ a variant of K&R for C/C++
 - ▶ Doxygen for self-documented code
- Using different technologies and languages (Qt, GTK, Python, SQLite, RDF)
- Automated system testing
 - ▶ based on usecase scenarios
 - ▶ calls to GUI is replaced with testing code (predefined scenarios and checks)
 - ▶ each test includes several checks
- GUI checklist
- Valgrind for analyse resource consumption



Feedback to developers community

- Our projects actively use many incoming (hot) technologies
- Send feedback to bugzilla, forums, mailing lists.

Latest feedbacks

- Memory leaks in PySide
- Proxy support in Qt
- SOAP support in Qt
- Support json project
- Deleted packages on maemo.org



Conclusion

- Maemo education
Maemo 5, Maemo 6, ...
- Open source SE projects
- Smart Spaces,
the Smart-M3 platform
- Symbian education

<http://oss.fruct.org>

<http://wiki.fruct.org>

WIKI.FRUCT.ORG

FRUCT MOEMO.FRUCT.ORG OSS.FRUCT.ORG

Википедия для пользователей

Данная страница содержит информацию для начинающих и продвинутых пользователей устройств Nokia Maemo.

В основном, здесь, представлены инструкции для установки программ, конфигурации приложений, добавления новых слотов или других действий для получения максимальной отдачей от устройства без ввода или изменения программного кода.

Пользователи (условно) разделены на 2 категории: **Начинающие** и **Продвинутые**.

Если не знаете, к какой категории должна принадлежать страница, которую вы создали/редактировали, то используйте категорию **Пользователи**.

Начинающие:	Продвинутые:
<ul style="list-style-type: none"> • Восстановление заводских настроек • Защита экрана • Установка Maemo на кельские пользователи Другие темы... 	<ul style="list-style-type: none"> • Емкостная ручка • Установка приложений • Меню Транзакции • Протокол JSC для postm • Репозиторий E9a Другие темы...

Просмотры

- Категория
- Обсуждения
- Просмотр
- История

Открытые платформы для мобильных устройств

Новости | О ресурсе | Вики разработчика | Форум | Регистрация

Nokia поддерживает развитие MAEMO/MeeGo-сообщества в России

04.03.2010

При поддержке компании создана новая Интернет-площадка сообщества, а также планируется проведение серии специализированных мероприятий для разработчиков и пользователей.

Подробнее...

Рубрика: Maemo | Нет комментариев

Релиз проекта SmartSlog

01.03.2010

Опубликован первый релиз проекта SmartSlog (The Petrus ANSI C Library Generator for Smart Space Ontology, <http://sourceforge.net/projects/smartslog/>). Проект выполняется в лаборатории Беспроводных и мобильных технологий ПетрГУ-Nokia-RS.

В рамках проекта создается генератор ANSI C библиотек по заданной онтологии. Генератор используется в платформе Smart-M3 (<http://sourceforge.net/projects/smart-m3/>). Онтология описывает формат хранения знаний в интеллектуальном сетевом пространстве. Доступом и хранением данных занимается семантический информационный брокер (semantic information broker, SIB). Потребителями и производителями знаний являются "процессоры знаний" (knowledge processor, KP).

Генератор по заданной онтологии создает библиотек, на основе которой погнанист

Рубрика новостей

- FRUCT (3)
- M3 (1)
- Maemo (21)
- Qt (3)
- Без рубрики (1)
- Обучение (12)

Ссылки

- Maemo
- Qt
- Symbian

Личные инструменты

Войти

Архив новостей

- Март 2010
- Январь 2010
- Декабрь 2009
- Ноябрь 2009
- Октябрь 2009
- Сентябрь 2009
- Май 2009
- Апрель 2009
- Февраль 2009

