Trainings and Development

in Qt Framework:

Experience of PetrSU FRUCT Lab

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Meet the PetrSU FRUCT Lab

FRUCT

FRUCT Lab

**IT-Park
of PetrSU**

**Faculty of Math.
CS Department**

Departments

Departments of:

- Calculus (prof. V. V. Starkov)

- Probability and Data Mining (prof. A. A. Rogov)

- Geometry and Topology (prof. A. V. Ivanov)

- Mathematical Modeling of Control Systems (prof. E. A. Pitukhin)

Provide solid mathematical background

Departments

Departments of:

- Applied Mathematics and Cybernetics (rector of PetrSU, prof. A. V. Voronin) http://pmik.petrsu.ru

- Computer Science (Yu. A. Bogoyavlensky) http://cs.karelia.ru

Responsible for Computing courses

Preparation of Software Developers

- Programmers activities club
  - Career-guidance of school pupils
  - Trainings in programming since twelve years
  - Over 100 participants (students and pupils)
  - Preparation for individual and team programming contests

Preparation of Software Developers

- Evolutionary developers' training approach

    - 1st year — basic programming skills including C and C++ languages, Unix shell, assembly language (IA-32 and Intel 64), basic algorithms, discrete math

    - 2nd year — operating systems and networking, system and network programming, combinatorial algorithms, modern development environments (java and .net), databases
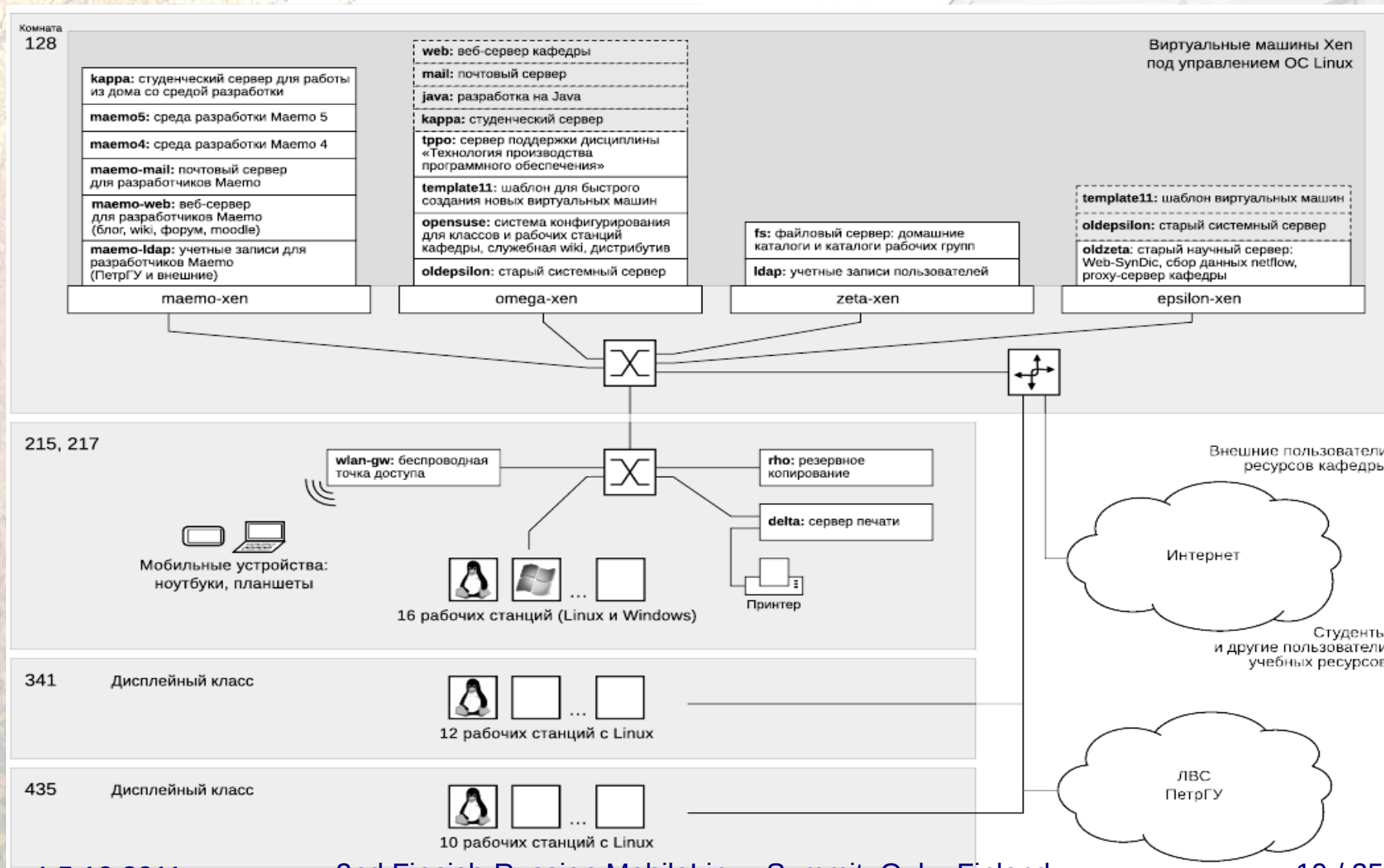
Preparation of Software Developers

- Training approach (continuation)

  - 3rd year — web-technologies, architecture of modern computers and embedded systems, numerical methods, applied optimization

  - 3rd year — software engineering

  - (and at last...) 3rd year — team software project (5-6 developers x 15 weaks x 10 hours)

- Most of courses use OSS (computing infrastructure based on OSS is used in education since 2000, in research since 1997)

Preparation of Software Developers

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Infrastructure: 1994 - 2000 - 2011

Additional OSS-related Courses

- Developed in cooperation with FRUCT
    - GUI Development with GTK+ and Qt (I) (Qt)
    - Unix Programming (II)
    - Programming for MIDs (II) (Qt)
    - Programming for MobileLinux (III) (Qt)
    - Mobile Services (VI) (Qt + Qt Mobility) *

- oss.fruct.org/moodle/

    (*) - for those MSc students, who couldn't take MobileLinux courses before

Trainings

- A lot of training in MobileLinux and Qt
  - Maemo 4 Summer School (2008, PetrSU)
  - Maemo 4 Winter School (2009, PetrSU)
  - Maemo 4 Training (2009, SUAI — FRUCT 5)
  - Maemo 5 Training (2009, N. Novgorod)
  - Qt Winter School (2010, PetrSU)
  - MeeGo Winter School (2011, PetrSU)
  - MeeGo Dev. for Beginners (2011, Moscow)
  - Qt Training (2011, Yaroslavl)

SE Projects: details

- 5th semester

  – Theory + miniproject

- 6th semester

  – Software Project

- Further development in the context of

  – Special Courses

  – Term Project (and Bsc)

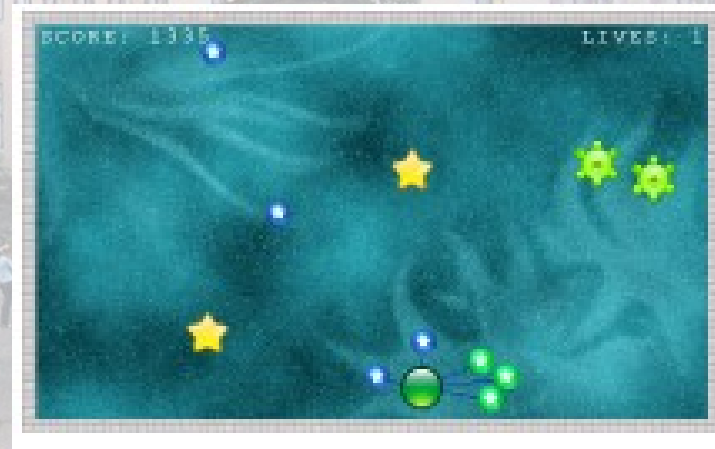 – Summer Practice
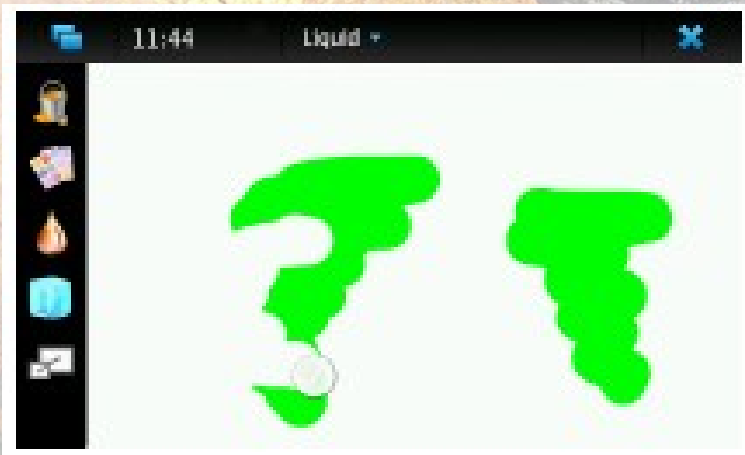
SE Projects: Typical Project

- 4-6 developers (3rd year students)
- The customer
  - The problem
- The instructor
  - Watching and assessment
- Time resources
  - Approx. 15 hours per week
- se.cs.karelia.ru

SE Projects: Special (Lab) Project

- 3-5 developers + 1-2 seniors

- Industry partner cooperation

- The instructor has some management functions

- Time resources - approx. 19 hours per week

- oss.fruct.org/wiki/

- Bug tracking, repositories, continuous testing and so on...

PetrSU FRUCT Lab Qt Projects: Games

- Liquid: a graphic editor with accelerometer support

- Shariks: physical law driven game

- More than 100K downloads, awards

FRUCT Lab Qt Projects: MySocials

- Social networks interaction on the base of API

- Initially was developed for Maemo 5

- Currently core MySocials components are being ported to Qt

Preparation of Software Developers

- ## Software Projects

    - Successful teams participate serious projects

    - Regular high places in Microsoft Technologies in Software Engineering and Software Development

    - International student projects participation

Preparation of Software Developers

- Programming contests
  - Regular trainings and local contests
  - Summer and winter schools in algorithms with participation of programmers from Russian and abroad universities and world champions
  - Participation in Final of ACM International Collegiate Programming Contest during last 12 years

  - Silver Medals in 2010

Innovative Activities in IT

- IT-park on the basis of PetrSU
  - Joint Automation Systems Centre of PetrSU-Metso
  - Research and Educational Centre «Plasma»
  - Laboratory of Distributed Systems
  - Centre of Wireless and Mobile Communications
- Regional Centre of Modern Information Technologies

Innovative Activities in IT

- Joint Automation Systems Centre of PetrSU-Metso

  - Created in 2002 on the base of Applied Mathematics and Cybernetics Department

  - The main goal is effective development activity in cooperation with industry

  - Wide geography of customers (Russia and Europe)

  - http://pmasc.karelia.ru

Innovative Activities in IT

- Laboratory of Distributed Systems
  - Created in 2005 on the base of Computer Science Department
  - The main research areas are:
    - Network performance analysis
    - Peer-to-peer networking

Innovative Activities in IT

- Regional Centre of Modern Information Technologies
  - Regional educational projects
  - E-learning technologies
  - Geoinformation systems
  - Law databases and e-government support
  - University computing infrastructure support
  - http://rcnit.karelia.ru

International Cooperation

- Cooperation with Metso Automation

- Cooperation with Helsinki University

- Finnish Russian Cross-Border University

- International Software Projects

International Cooperation

- Cooperation with Metso Automation
  - 15 years of cooperation
  - Joint conferences "New Information Technologies in Pulp and Paper Industry" since 1994
  - Trainings on Damatic Xdi and metsoDNA for students and specialists
  - Participation in Metso projects in Surgut, Poltava, Kondopoga
  - Joint Automation Systems Centre of PetrSU-Metso on the basis of PetrSU (since 2002)

International Cooperation

- ## Cooperation with Helsinki University

    – 15 years of cooperation

    – Finnish Data Processing Weeks in PetrSU as guest lecturers weeks (since 1993)

    – FDPW in form of scientific seminar. Proceedings are regularly published (since 1997)

    – Advances in Methods of Information and Communcation Technology (since 2006)

International Cooperation

- Cooperation with Helsinki University

  – Common Core of academic curriculums was developed in collaboration with prof. Timo Alanko

  – On the basis of this Common Core in 2001 new specialization area was opened

  – The area corresponds to the specialization area "Distributed Systems and Data Communications" of the University of Helsinki
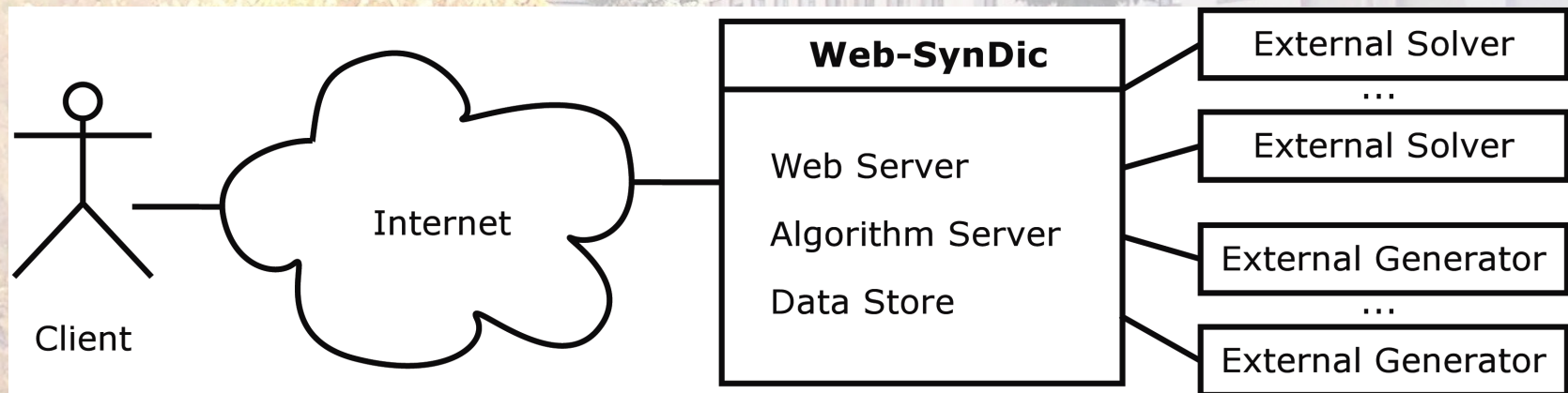
International Cooperation

- Finnish-Russian Cross-Border University

  – The Faculty participates actively in Information and Communication Technology pilot group

  – Curriculum for Master's Degree Programme for the pilot is developed and accepted on the University level on 18.09.2006

  – Summer Schools

International Cooperation

- CBU Summer School at PertSU
  16-25 of August 2006

  - Dr. Olga Bogoyavlenskaya conducted the course "Performance Modelling for Wireless Data Communication"

  - Dr. Dmitriy Korzun conducted the course "Routing Algorithms in Structured Peer-to-Peer Systems"

  - The school was attended by students of the University of Kuopio, Laapeenranta University of Technology, Saint-Petersburg Polytechnic University, SPbSU and PetrSU. Totally 10 students

International Cooperation

- ## Software Projects: WebSynDic
  - Solver of Linear Diophantine Equations
  - http://websyndic.cs.karelia.ru

International Cooperation

- Software Projects: WebSynDic
  - Start: 07.07.2003
  - Requirement analysis: Jul – Aug 2003
  - Design: Sep – Nov 2003
  - Implementation: Nov – Dec 2003
  - Testing: Dec 2003 – Mar 2004
  - 1st working version: Mar 2004
  - Release: Aug – Sep 2004
  - 11907 LOC, C, Java

International Cooperation

- Software Projects: WebSynDic

  - Input example:

    x1 + x2 = 2*x1 + 3*x3

    x3 + x4 = x1 + 2*x2 + x3

  - Output example:

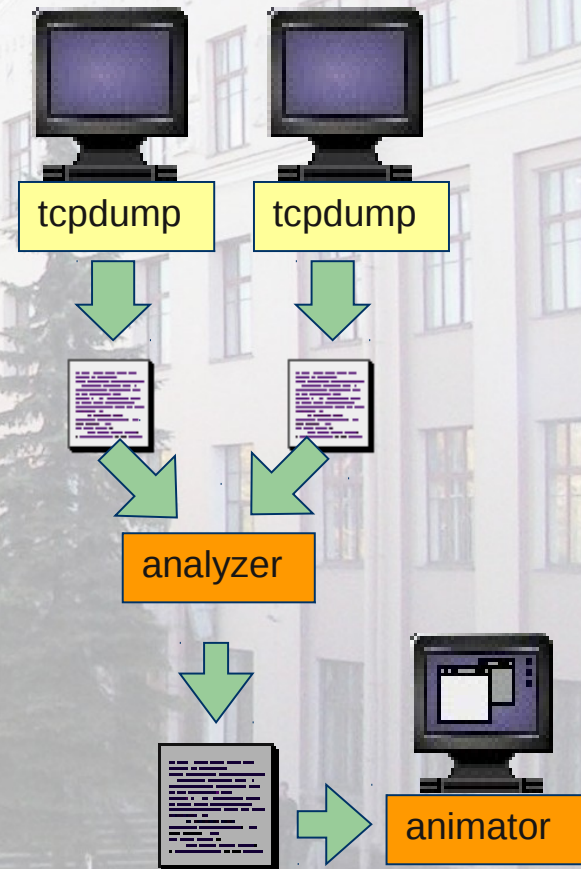   h1 = (1,1,0,3)

    h2 = (0,3,1,6)

International Cooperation

- Software Projects: DaCoPAn

  - Data Communication Protocol Analyzer

  - International developers team

  - Start: 19.01.2004

  - Finish: 31.05.2004

  - http://dacopan.cs.karelia.ru

International Cooperation

- Software Projects: DaCoPAn
  - Work time – 134 days, 31 day of collaboration
  - Implementation – 12.000 LOC C, Java, 5.500 lines of comments.
  - Documentation – 15 documents, 346 pages.
  - E-mails – 650 messages.
    Forum – 46 topics, 296 messages.
  - Test plan – 126 test cases.
  - Integration testing – 25 errors found.