

Linux Development

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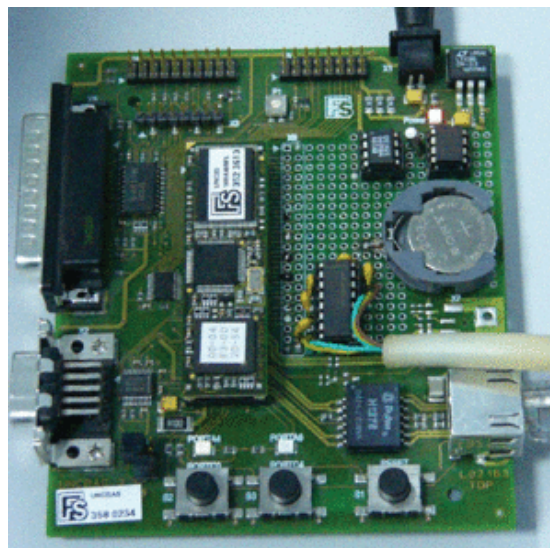
In our company, the development of Linux projects started from the time the company was created. In these years we accumulated rich library of Linux applets developed by our specialists that can be used in any future projects saving project time and its cost.

The share of Linux projects realized by our professional team of developers is almost the same as projects based on MS Windows operating system. A lot of our clients want us to develop new products operating specifically in this OS.

In this paper we would like to present to you some of our numerous Linux projects realized by our company over the years of our existence. Some of these projects are still under development. We are ready to meet new challenges in Linux development as well as to develop similar products if it will be required from us. If your business needs any Linux-based solutions you can get them for moderate cost and on highly professional level from Sibers company.

uClinux Data Logger

uClinux Data Logger is the system for the solar power stations, measuring the temperature, irradiation and other data, the system is configured to collect. Any number of the digital and analog counters can be connected to the system. The system includes the hardware and software parts. The hardware contains a UNC unit, a MSP unit and digital (analog) counters. We used off-the-shelf software to store the data from counters and developed the software for UNC. The latter is to log the data from MSP in the files, to get access to the data via web and to control the MSP.



pic. 1 uClinux Data Logger

The counters are connected to MSP and the MSP is connected to the UNC via i2c bus. The MSP saves the data from counters. Since the MSP doesn't have enough resources to do some calculation with data, the UNC is used for these purposes. As part of the project, we developed Data Logger application that receives data from MSP, to log the data in the files and to set them to the Web Server. Also we developed a web application to get access to the data and to control the MSP (set some commands, set some variables, etc). In addition, the kernel of the uClinux was expanded to have the user management, ftp and telnet support.

This project started a year and it is still under development since our clients who asked us to work on it want us to expand its functionality with each new feature added.

Project's Features

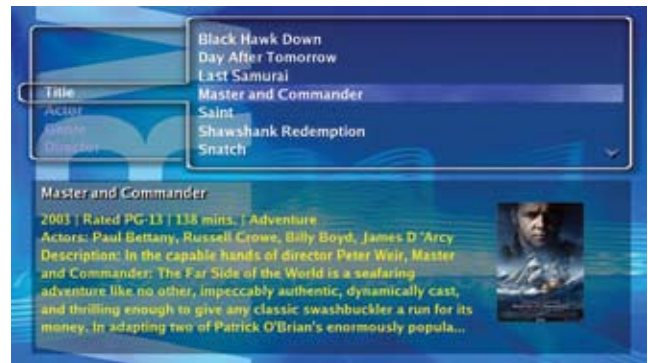
So far we have implemented the following features:

- The UNC module communicates with MSP to get the data from it via i2c bus in standard 100kHz mode. We developed the high level driver to work for i2c protocol and modified the low level driver i2c driver to support so called time stretching.
- We developed Data Logger application which gets/sets the data from/to the MSP (via i2c) and logs them into log files/writes in the MSP. Data Logger loads its parameters (station ID, log intervals, etc) from ini config file.
- We ported Boa web server to get this working on the UNC module with uClinux 2.4
- We developed multilingual web application to provide the web interface to configuring of the system and logged data. It's developed as a generic CGI application with supporting user templates for web pages.
- We added user management (accounting) and security system in the uClinux.
- We modified FTP and Telnet daemons server in the system.
- We have added auto power on and off during normal operation (power save and wakeup).

project

Home Entertainment Center

This application is a multimedia home system with client-server architecture. It allows playing music and video discs by loading them into media library. All of the media library is stored on the server and can be played either on any client computer or on the server. The whole system can be controlled via one touch screen connected to any unit.



pic. 2 Home Entertainment Center Interface

Application's functionality

- Play CD
- Play DVD
- Play media from library
- Load CD: mp3,flac,vorbis/ogg formats
- Load DVD (include ARCCOS (Sony) protected)
- Capture video from PVR card
- Search movie or music by different parameters.
- Make playlists (both music and video)
- Load information about movie/music from internet
- API for control via IP, RS-232
- Remote control support
- Touch panels support (Crestron, AMX)
- Scheduled autoupdate
- Bug report sending
- Load content in background
- MPAA and custom ratings support
- Platform: Linux (Fedora core)

Technologies

used during project development

- C++
- Qt
- MySQL
- Shell script
- PERL
- PHP
- SDL
- GL
- RPM
- XML

project

Caption Extractor Project

Caption Extractor is an application extracting closed captions from MPEG2 video files. The files are recorded using mythtv (www.mythtv.org), the ivtv driver and PVR 250 video capture card. Captions are embedded with `ivtcvtl -b cc /dev/vbi0`. The application has no GUI and the file for captions extraction is passed to it in the command line. The application saves the extracted captions along with the time stamps.

Technologies

used during project development

- C++

project

Insight Toolkit Addon

This project stands apart from most of the projects Sibers company usually develops since it is related to scientific research.

Our client is interested in compensation for motion of a subject during an MRI scan. An MRI scans are widely used for diagnosis, and for clinical research, due to the ability of the MRI scanner to provide images of the subject.

Our client frequently uses images of the brain. An MRI scanner makes images by encoding the position in space of resonating protons with phase and frequency information. In effect, the MRI scanner makes an image by acquiring data which is the Fourier transform of the patient's image, and then computing the inverse Fourier transform. This usually works well.

However, certain patient's are not able to hold still during the scan. Since MRI encodes spatial position using phase and frequency encoding, if a patient moves position one time during a scan, the result is that the scanner measures parts of the Fourier transform of two different images. Several groups have investigated different procedures by which this motion may be compensated for.

In essence, the motion can be estimated and the best image recovered, by examining the data to see if translations or rotations applied to some of the Fourier transform of the image, when subject to an inverse Fourier transform, make a better looking image.

That is, the client's team solve an optimization problem with an image quality metric, where it attempts to identify rotation and translation parameters associated with the acquisition of each phase encoded line of the Fourier transform (in 2D that would be motion parameters for each column, but not for the rows).

In the case of translational motion of an image, the Fourier transform of the image undergoes a phase shift.

Currently this project is under development and its complete functionality is not developed yet.

Technologies used during project development

- C++

project

Asterisk PBX Connection

Voice over Internet Protocol (VoIP) is a technology that allows you to make telephone calls using a broadband Internet connection instead of a regular (or analog) phone line.

Phone service via VoIP is free or costs less than equivalent service from traditional sources but similar to alternative Public Switched Telephone Network (PSTN) service providers. Some cost savings are due to using a single network to carry voice and data, especially where users have existing underutilized network capacity they can use for VoIP at no additional cost. VoIP to VoIP phone calls on any provider are typically free, whilst VoIP to PSTN calls generally costs the VoIP user.

Project features

- *VoIP turnkey system integration with Cisco VoIP phones, using SIP and SCCP protocols*

- *Analog phone integration with Asterisk PBX*

Ability to redirect calls made from analog phones to Asterisk PBX

- *Voice Mail Message Notification – Telephone*

When a message is left in a voice mailbox, a call should be placed to notify that individual of the message and allow the individual to enter the voice mailbox to retrieve the message.

- *Integrating the 7914 Expansion Module*

The CTX 5000 is able to employ up to 2 7914 expansion modules.

- *Creation of context sensitive keys on the LCD screen of the Cisco 79XX series phones*

These phones present titles within the LCD screen that are associated with physical buttons on the phone. The titles vary by phone state, displaying the function associated with the button nearest the title.

- *Obtain a Trunk Line*

The system allows the phone user to obtain a CO trunk line for an outbound call by doing no more than pressing a key / button.

Technologies

used during the project development

- C++
- QT Library

project

QuantaView

QuantaView falls into the category of a Network Behavior Anomaly Detection (NBAD) system, and as such it is designed to solve three main problems in computer security:

- **Worm Detection** - Worms can be delivered to their intended targets via 0-day vulnerabilities, and as such traditional signature-based intrusion detection systems are not well suited to detecting them.

- **DDoS Detection** – Program detects two styles of DDoS attacks; those that use large ICMP packets, and SYN floods. Both of these types of DDoS attacks are typically spoofed from arbitrary source addresses, and target a single IP (or small set of IPs).

- **Vulnerability Scoring** - Every system that is monitored runs a set of userland applications. Each of these applications has an associated set of vulnerabilities, and from this set of vulnerabilities QuantaView derives a score that represents the seriousness of the vulnerability stance on the system.

Project features

- Threats detection in the local subnets
- Worm Detection
- DDoS Detection
- Vulnerability Scoring

Technologies

used during project development

- Multy Threading
- Stack of IP protocols
- C
- Inter Process Communication (IPC)

Pic. 3 Quanta View Interface

