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IMPLEMENTATION OF HOSTING AND MULTI SERVER MANAGEMENT CONTROL PANEL FOR MULTITRONIC

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“Watchman, what do you say of the night? The night is long ... but the day comes! Thus spoke Sylvanus Olympio the first President of Togo (West Africa). Through struggles and effort I could now see the day rising and the timid rays of sun appearing in the horizon ushering me to this academic achievement.

To my Mother and Father who have been my best teachers in life and who through effort and extraordinary sacrifices raised a boy to become a man I am today, I dedicate this thesis.

To my fiancée Ahiale Delali who has always been on my side to encourage and support me from day one and throughout my whole education here in Finland

To my brothers, sisters and their respective families I show a great appreciation for their motivation, guidance and prayers.

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To Patrik Hall a CTO at Multitronic for his kindness and trust by allowing me to carry this thesis project inside his company I show my deep appreciation

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Kodjovi Nyalali Lotchi

ABSTRACT

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The objective of this thesis work is to implement a hosting and multi-server management control panel for Multitronic a Web shop and Web hosting company in Finland.

First and foremost, the current situation at Multitronic as far as web hosting and server management are concerned was studied. The objective was to analyse ways to improve their current system and allow customers to manage their own various hosted services from a single panel. For this purpose ISPConfig 3 an open source hosting control panel for Linux was used.

After the implementation of ISPConfig, the next activity was to create users and to migrate some existing clients from the old servers to ISPConfig. A security consideration was taken into account in order to prevent any intrusion and hacking on the servers.

The outcome of this thesis work will be double. Firstly, it is possible to have all servers controlled and managed from a single control panel by the administrator. Secondly the users namely Resellers and Clients who have their web applications, Emails, and other services hosted by Multitronic can manage them from ISPConfig web interface.

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ABBREVIATIONS

CGI	Common Gateway Interface
CTO	Chief Technical Officer
DNS	Domain Name Server
FCGI	Fast Common Gateway Interface
FTP	File Transfer Protocol
HTTP	Hypertext Transfer Protocol
IMAP	Internet Message Access Protocol
IP	Internet Protocol
IPv4	Internet Protocol version 4
IPv6	Internet Protocol version 6
MTA	Mail Transfer Agent
PHP	Hypertext Preprocessor
PHP-FM	Hypertext Pre-processor - fastCGI Manager
POP3	Post Office Protocol 3
RDBMS	Relational Database Management System
SFTP	Secure File Transfer Protocol
SMTP	Simple Mail Transfer Protocol
SNI	Server Name Indication
SSL	Secure Sockets Layer
TLS	Transport Layer Security

URL	Uniform Resource Locator
Vsftp	Very Secure File Transfer Protocol
WebDAV	Web Distributed Authoring and Versioning

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1 INTRODUCTION

As the world of Information Technology becomes more and more virtual and dynamic, it is important to come out with better and efficient ways to store, manage and share data and files. Servers constitute a core element in this infrastructure. But better services are offered if multiple servers are well managed and administered. Likewise, with the boom of internet many people and companies need a simple yet robust control panel in order to manage their web applications, websites and/or Email services. But few of them can host and manage these services on their own physical servers. Therefore, they need the services of professional hosting companies. Multitronic is one of them. Over the years they have been providing hosting services to companies and individuals.

However, they have been confronted with some challenges related to the management of their servers, and the services provided to their customers. The first challenge is to give the customer a client level access to the Multitronic servers. Secondly, since multiple servers are administered by Multitronic, it could be better and more efficient to have a single control panel through which all servers are managed. Finally, like any server, those at Multitronic are also confronted to security and vulnerability threats.

The objective of this thesis is to address these problems. A suitable tool to take care of this is ISPCConfig 3, a Linux based hosting control panel. All existing servers will therefore be managed from ISPCConfig 3. Three users (administrators, resellers, clients) with different permission level to ISPCConfig will be created.

The first phase of this thesis will be to study the current situation at Multitronic and determine why ISPCConfig is a suitable tool to be used. After that a description of the application as well as its various functionalities will be made. The second phase will involve the implementation of ISPCConfig 3 followed by the reinforcement of security considerations. After that all existing clients, files and databases will be migrated from the existing servers to ISPCConfig.

2 CURRENT SITUATION AND AIM OF THE PROJECT

Before deploying any new system at Multitronic it was appropriate to look at the current situation onsite. Their activities, services and technologies were studied.

2.1 Multitronic Oy

Multitronic Oy is a Finnish company founded in 1995. Currently it is one of the leading web shops in Finland.

The activities of Multitronic Oy evolve around four main areas:

- Web shop
- Internet
- Services
- Programming

Multitronic Oy has over 20 000 different products in their web shop. The product can be ordered online or picked at the shop. They also offer to their customers the possibility to have a customized built computer.

Multitronic Oy provides internet based and web services such as web application and website hosting as well as email hosting on their own reliable servers.

In a large scale, Multitronic Oy offers various hardware and software services on computers, computer peripherals, network and data security and servers. They also provide after sales services.

With their own programming department and team they take care of any programming application and system they will need. On demand they also perform programming tasks for their customers.

2.2 Current Situation and Technology

The current situation of the multiple servers and their tasks were explained here.

2.2.1 Networks and Servers

Multitronic Oy connects to internet by means of two public IP addresses 231.28.138.32/27 and 194.197.222.0/24. In the firewall IPs in 231.28.138.32/27 network are mapped to internal IP addresses. IPs in the 194.197.222.0/24 network are routed. The internal IP addresses are assigned as shown below in Table 1.

Table 1. The internal IP addresses

10.3.1.0/24	Office network
10.3.2.0/24	DMZ network for servers
10.3.4.0/24	Storage network

2.2.2 Servers

A server is a computer dedicated to run one or more services as a host to serve the needs of the users of other computers on a network. There are various types of servers running at Multitronic. They are structured as follows:

- Physical Server
- VMware vSphere
- Servers for Web and Email Services

The entire list of all twelve various servers and their respective task is shown in Appendix 1

Judging by the high number of servers managed at Multitronic, it is easy to see how challenging it will be to administer them effectively. Eventually, the administrator shifts from one shell interface to another.

Furthermore, Multitronic provides to their customers various internet services, such as website and/or email hosting, server management. The customers need to connect to the Multitronic servers in order to perform some basic tasks related to their own activities, such as the management of their websites, creation of email,

FTP accounts and sub domains. But the challenge is to have a web interface or web based control panel where the clients can login. From there it will be possible for them to have a user friendly interface in order to manage some of their own services. By doing so there will not be need for instance to ask an administrator at Multitronic to create a sub-domain or an Email account.

The security threats and an intrusion is another serious situation the company is facing. There have been attacks and hacking on the servers . It is a must that the running servers or any new one should have en enforced security features.

2.3 Structure of the Thesis

This thesis is structured in six main chapters.

Chapter 3 discusses other control panels. The focus is on two types of application:

- Open source application: Virtualmin
- Proprietary application: C Panel

Chapter 4 is about the project development description. This will be the theory part of the project where a description about ISPCConfig will be made. The major functions will also be described.

Chapter 5 involves the implementation and the configuration of ISPCConfig 3.

Chapter 6 deals with the migration of files, clients and databases to ISPCConfig.

Finally in Chapter 7 a thorough analysis followed by a test is made on the system. The idea is to check if all functions and features are working properly.

3 OPEN SOURCE AND PROPRIETARY CONTROL PANEL SYSTEMS

There are both open sources and proprietary control panels available. One of each type is described below.

3.1 Open Source Control Panel System: Virtualmin

Virtualmin is a powerful and flexible web hosting control panel for Linux and UNIX systems. Its main role is to manage virtual domains, mailboxes, databases, applications, and the entire server. These services are taken care of via web interface; it offers four methods for managing servers: Web, mobile device, command line, and remote API. Virtualmin can be integrated with Cloudmin, Webmin, and Usermin for management of a whole data centre. The Figure 1 shows the dashboard of Virtualmin. /1/

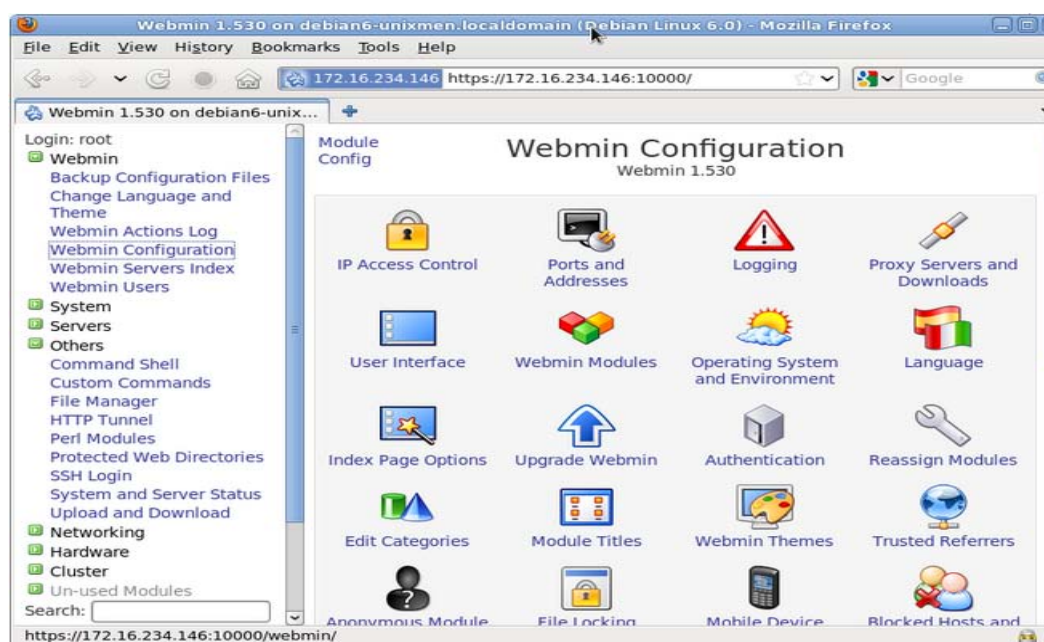


Figure 1. Dashboard of Virtualmin

3.2 Proprietary Control Panel System: cPanel

cPanel is defined by most people as the most popular, and first, commercially-available control panel software available on the market.

cPanel is based in Unix and provides a web hosting control panel. It also gives to the user a graphical interface and automation tools that can help in the process of creating and hosting a webpage. It allows integration for other third party module. It can be used as a dedicated server or virtual private server. The Figure 2 shows the dashboard of cPanel /2/



Figure 2. Dashboard of cPanel

3.3 Hosting and Multi server Control Panel System: ISPConfig

The challenges listed in Chapter 2.2 show how important it is for Multitronic to upgrade their system as far server management is concerned. They need a system that will provide a possibility to perform a multi-server management panel. With it the main admin could be able to manage all their services.

There is also a need to manage their client effectively and give them a web interface from which they could manage some of their own services. A customer having a web or Email hosting plan with Multitronic should be able to create emails, databases and FTP accounts, set quota and perform any tasks he might need for his business.

It is also very important to have a system that takes into account security considerations. Because of the use of dynamic pages with PHP nowadays it is capital to secure web and database servers in order to prevent any intrusion.

3.3.1 Choosing the suitable tools

There are many hosting control panel available. Before choosing the suitable one, there have been several discussions with Multitronic. In the discussions, few of the existing panels were compared to ISPConfig based on the type of licence used and some key features supported. It came out clearly that ISPConfig is an open source application therefore there will not be a need to buy an expensive licence. Furthermore ISPConfig support some key features that are not found in some of the other hosting panels. Some of these features are: plug-in support, IPV6 (for future use), secure file transfer tool using Vsftp and open source MTA named Postfix. After taking into consideration all these parameters, ISPConfig was selected.

3.3.2 ISPConfig 3

ISPConfig 3 is an open source hosting control panel for Linux which is capable of managing multiple servers from one control panel. With this control panel, it is possible for an administrator to manage websites, emails and etc. ISPConfig is an open source application with BSD license. This project started in 2005 and was implemented by the German company Projektfarm GmbH. /3/

4 PROJECT DEVELOPMENT DESCRIPTION

The ISPConfig was described in this part. The recommended application and the Linux distribution were listed.

4.1 Different Type of Installations of ISPConfig 3

There are three different types of setup.

- Single Server Setup
- Multiple Server Setup
- Mirror Server Setup

The single server setup consists of having the name, web, database and email servers installed on a single server. ISPConfig also is installed on the same server. This type of setup is the most spread because it involves fewer resources and is quite easy to install and configure. A single physical or virtual server could be used /4/

The multiple-server setup consists of controlling multiple dedicated servers from just one ISPConfig installation. In this case all services (web, email, DNS, MySQL) are hosted on each server. Another possibility is to setup dedicated servers for each service (dedicated web servers, dedicated email servers, dedicated DNS servers, dedicated MySQL database servers), yet having all of them managed by ISPConfig.

The advantage of the multiple server setups is that it is more scalable. If in the future more websites or databases are needed, it will be simple to extend the system by adding more servers. This feature is practical because if in a future there happen to be an old webpage that cannot run a newer version of PHP the administrator can just add a new extra web server with an older version of PHP on it. /4, 43-68/

The mirror server setup consists of creating slave servers or mirrors of the ISPConfig server. In this case only the configurations on the master server can be

copied from the master to the mirror. This server cannot contain any item like web site content or databases. /4, 11/

4.2 Supported Daemons/Software and Linux Distribution

ISPConfig support multiple Daemons/Software and managed services:

- IPv4 support: it is the fourth generation of internet protocol. It uses 32-bit address.
- IPv6 support: it is the latest revision of the internet protocol. It uses 128-bit address.
- Websites tools
- FTP users: these are users that can make a file transfer from one host to another one.
- MySQL databases: this is the most used open source relational database management system (RDBMS)
- Shell users: this user can have access to the shell command line
- Email tools
- DNS: this is the naming system for computers, services or resources connected to the internet or to a private network.
- Virtualization (through OpenVZ): this tool takes care of creating virtual servers.
- Firewall: it controls the incoming and outgoing network traffic. It determines whether a data should be allowed to pass or not.
- Webalizer & AWStats statistics: these two applications generate analysis for the WebPages. They show statistics about the number of visitors, hits, referrers, and etc.
- Quota/Traffic Limits: these tools are used by the administrator to limit different type of quota to the end user

The supported Linux distributions are:

- Debian 5 & 6 (**recommended**)
- Ubuntu 8.10 – 13.04 (**recommended**)

- CentOS 5.2 – 6.4
- Fedora 10 and 12-15
- OpenSuSE 11.1 – 12.2Be /5/

4.3 ISPConfig 3 Users

There are three access levels for ISPConfig users: admin, resellers, and clients.

4.3.1 Admin

Admin is the user with the highest permission and has full control over the ISP-Config control panel and all its functions. The admin account is the default account created with the installation. However this account is different from the root account which is a system user account. S/he creates all other accounts: other administrators with specific functions (for example web site admin, DNS admin), reseller and clients. The main administrator gives rights, privileges and quotas to the resellers and clients depending on how much they are willing to pay.

4.3.2 Resellers

Resellers are companies or individuals who sell Web hosting. It usually refers to companies that own a dedicated server or have bought a reseller hosting plan from another Web hosting provider.

Having a reseller account gives privileges to have access to almost all modules and parts of the system configuration. A reseller can create clients and sell to them services (web hosting, email hosting, DNS hosting, etc.).

4.3.3 Client

A client is a company or individual that buys web hosting services from either the admin or the reseller. A client can have multiple websites and/or email accounts as well as other services depending how much he is willing to pay. S/he can be created by a reseller or directly by the admin.

4.4 Reference about Modules, Functions and Forms

Some main modules found in ISPConfig are introduced next.

4.4.1 Tabs

After login ISPConfig has the following tabs depending on the user. The admin has access to all modules whereas the reseller and the client have access to only selected modules. The modules are: Home, Sites, Email, Monitor, System, DNS, Help, Client and Tools. The Figure 3 gave an overview for these modules.

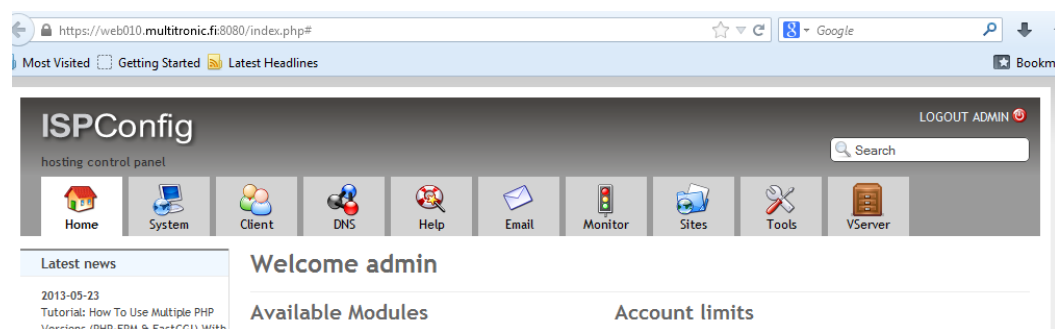


Figure 3. ISPConfig different modules.

4.4.2 Tools

There are useful tools to manage various services.

User settings include e.g. password and language. After login in for the first time, the user is asked to change the password for a new one for security reason. Another setting is related to the language. As of today ISPConfig is available in 22 languages.

The interface is where the theme and start module can be changed. By default upon login the user is directed to the dashboard.

By means of *Resync tool*, all configuration files are rewriting. This is useful in the case the configurations are lost. To bring the lost files back, Resync tool is used again.

4.4.3 Sites

From the sites tab one can create WebPages, Domains and Sub domains (for websites and VHost), FTP accounts, shell users, MySQL databases, and cron jobs. Full statistics can be obtained from here as well as the display of disk quota. The admin can enable or disable various features (like PHP, CGI, SSL, SuExe, etc.) according to the need of the client.

4.4.4 Email

Here is where email accounts area created. By connecting to the web server some email protocols are defined: email forwarding, spam filter settings, configuration of the system, fetch mail from remote POP3 and/or IMAP servers, black- and white lists, etc.

4.4.5 DNS

From this tab the admin creates the zone and DNS for various domains. This can be done in two ways:

- Using DNS wizard found in ISPCConfig. This wizard allows automatically the creation of a set of common DNS.
- Creating DNS manually. This is for experienced users. Here an existing DNS zones can be modified and a new one creates

4.4.6 Monitor

Under the monitor tab the state of all servers are displayed for better management. One can have an overview of the characteristics of the servers such as: logs, CPU, memory, disk usage. It also shows the system log and the job queue.

4.4.7 Domains

Here is where domains can be added. Later on the client will make use of it when he creates his website or an email account.

4.4.8 VServers

By means of VServers virtual machines can be created. In ISPConfig the technique used is based on openVZ which is an open source application. These types of servers are created by using either OS Templates or VM Template.

5 SYSTEM IMPLEMENTATION AND CONFIGURATION

At this stage of the thesis the focus was on the implementation and the configuration of the application.

5.1 Project Planning and Overview

A lot of considerations have been taken into account before the implementation of ISPCconfig. Since this application will be used in a production line by Multitronic, it is very important that several tests are made before the actual installation. For that reason a multiple test or setups (single-setup and multi-server setup) was conducted on various virtual servers running Ubuntu 12LTS and 13LTS and CentOS 6. All prerequisites were carefully analyzed and if possible a replacement was made on each needed application. Another important feature to consider prior to the installation is the security features since it will be impossible to install some of them after the installation of ISPCconfig.

5.2 Implementation of ISPCconfig 3

Prior to the installation a recommended Linux distribution mentioned in the chapter 4.2 was installed.

5.2.1 Single server Setup and Configuration

In this setup, a single server was used to hosts all needed servers such as web, email, DNS, database servers. After they have been installed and configured ISPCconfig is installed at the end.

The single-server setup was installed on two versions of Ubuntu (12 LTS and 13 LTS) and on CentOS6. The installations and configurations are quite similar for both servers. The base system is prepared with the configuration of the network, the host and the firewall. After that some needed applications were installed. Below are some of them:

- Quota: this application helped to assign a disk space and Email box quota to the client

- Apache: that was the web server installed. It was preferred to another one called Nginx
- MySQL: this application was already defined in 4.2
- PhpMyAdmin: this was a tool used to manage MySQL by means of the web browser.
- Courier-IMAP Courier-Authlib, And Maildrop: these applications were used to take care of the email services such as user authentication, mail filter and delivery.
- Postfix: it is a mail transfer agent (MTA). It was installed to take care of the electronic mail routing and delivery.
- Getmail: this was used for mail retrieval from POP3 and IMAP4 servers.
- Amavisd-new, SpamAssassin and ClamAV: these were the antivirus installed to protect the servers from any intrusion, spams or viruses.
- mod_php, mod_fcgi/PHP5, and suPHP: these were PHP versions and tools installed. Once the system was ready, suPHP can be used to execute PHP script with the permission of a client owning a file been executed.
- Ruby: it is an object-oriented programming language.
- WebDAV: this is a Web Distributed Authoring and Versioning. It was installed as a file server. It is a better file management tool for multiple users over the internet.
- Pureftpd: this is a secure FTP server.
- Bind: it is the most used DNS software on the internet
- Webalizer and AWStats: these tools were already defined in 4.2.
- Fail2ban: this application was installed as an intrusion prevention tool. It monitors log files and can ban a particular IP after several unsuccessful login attempt.
- SquirrelMail: this was an open source webmail used by ISPConfig.

And finally ISPConfig was installed and configured.

Although these applications were installed on the single-server setup, almost all of them were installed on the multi-server setup also.

However this setup was made just for the testing purpose. The idea was to get familiar with how ISPConfig works.

Some configurations of the single-server setup are shown in Appendix 3.

5.2.2 Multi server Setup and Configuration.

This installation is known as the five Ubuntu base systems because it involves five servers: one master server which runs the web server and ISPConfig, and four other dedicated servers which run the database, the email and the two DNS. These servers are named as follows with their respective IP address in Frame 1.

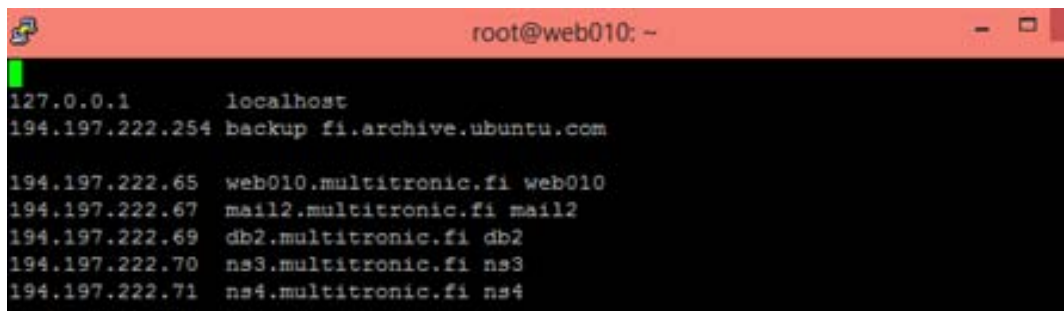
Server1:	194.197.222.65	web010.multitronic.fi	web010
Server2:	194.197.222.67	mail2. multitronic.fi	mail2
Server3:	194.197.222.69	db2.multitronic.fi	db2
Server4:	194.197.222.70	ns3.multitronic.fi	ns3
Server5:	194.197.222.71	ns4.multitronic.fi	ns4

Frame 1. Name and IP addresses of the Servers

All the five servers are installed separately. However it is to be noted that the installation steps are similar from one server to another with few variation. A description of how all servers are installed and configured is given below

5.2.3 Installation of the Server 1 (web server): web010. multitronic.fi

The first thing done here was to edit the hosts file and add the IP addresses and hostnames for all the five servers. After the editing, *etc/hosts* file looked like this as shown below in the Figure 4.



```

root@web010: ~
127.0.0.1      localhost
194.197.222.254 backup fi.archive.ubuntu.com

194.197.222.65 web010.multitronic.fi web010
194.197.222.67 mail2.multitronic.fi mail2
194.197.222.69 db2.multitronic.fi db2
194.197.222.70 ns3.multitronic.fi ns3
194.197.222.71 ns4.multitronic.fi ns4

```

Figure 4. Hosts file with the IP addresses of the Servers

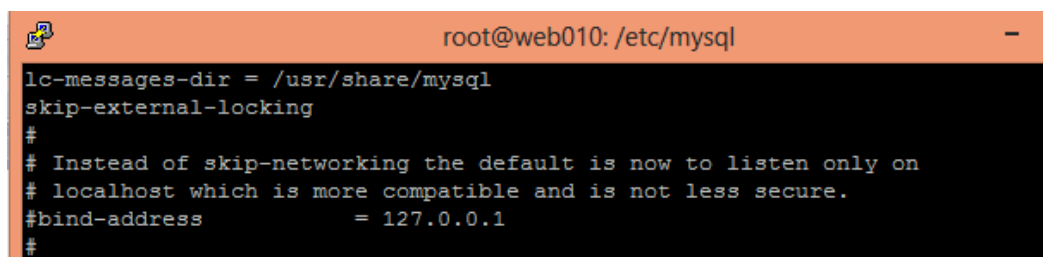
The next task is to synchronize the system clock with network Protocol time (NTP) and install MySQL server with this script:

```

apt-get -y install ntp update
apt-get -y install mysql-client mysql-server

```

MySQL was configured during the installation. The installer asked for the creation of a new password. This password is used later by the root to login to phpMyAdmin. Since this application will be accessed online it was appropriate to allow MySQL to listen to all the interfaces not only the localhost. For that reason the file named `/etc/mysql/my.cnf` was edited and the code line that forced MySQL to listen to the localhost only was commented out as shown in the Figure 5. /4, 23/



```

root@web010: /etc/mysql
lc-messages-dir = /usr/share/mysql
skip-external-locking
#
# Instead of skip-networking the default is now to listen only on
# localhost which is more compatible and is not less secure.
#bind-address      = 127.0.0.1
#

```

Figure 5. Edited version of the file `/etc/mysql/my.cnf` .

After that the following applications like Apache2, PHP5, phpMyAdmin, FCGI, suExec, Pear, mcrypt, PureFTPd, quota, vlogger, webalizer, and awstats were installed according to the ISPCConfig 3 Manual. /4, 24-25/

During the installation some apache module like suExec, rewrite, ssl, actions, include were enabled with the following command:

```
a2enmod suexec rewrite ssl actions include ruby dav_fs dav auth_digest
```

The installation of these apache modules were made for security reason. Under normal circumstances, CGI (Common Gate Interface) and SSI (Server Side Include) modules execute as the same user through all file because apache reads all file hosted on the web server. With suExec installed on the web server, Apache users can be able to run CGI and SSI under their own user ID and no more under the common ID. This feature can prevent anybody who is hosted on the web server to read the files or databases of another user hosted on the same web server. In the other hand, mod_rewrite can give possibility to manipulate URLs by means of website redirecting for instance. Some of these modules were installed by default by the Linux distribution. They were just enabled during this installation.

PureFTPD is then configured to allow FTP and TLS sessions. This configuration is important because TLS will encrypt the files transferred from the host to the web server. /4, 26/

```
echo 1 > /etc/pure-ftpd/conf/TLS
```

TLS need an SSL certificate to function. A free one could be generated as follows:

```
openssl req -x509 -nodes -days 7300 -newkey rsa:2048 -keyout  
/etc/ssl/private/pure-ftpd.pem -out /etc/ssl/private/pure-ftpd.pem
```

But Multitronic has his own certificate which was used for that purpose.

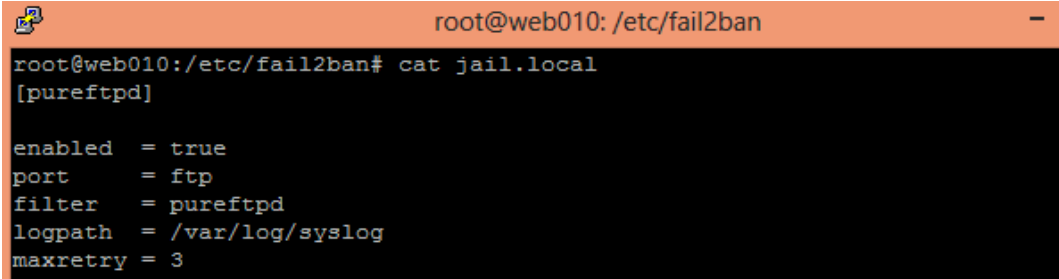
At this stage the pureFTPs was restarted and the file /etc/fstab was edited. Likewise, after the installation of vlogger, webalizer and awstats, a file named

/etc/cron.d/awstats was also edited. These two files were edited according to the ISPCConfig 3 Manual. /4, 24-25/

After that quota was enabled by the following command:

```
mount -o remount /
quotacheck -avugm quotaon -avug
```

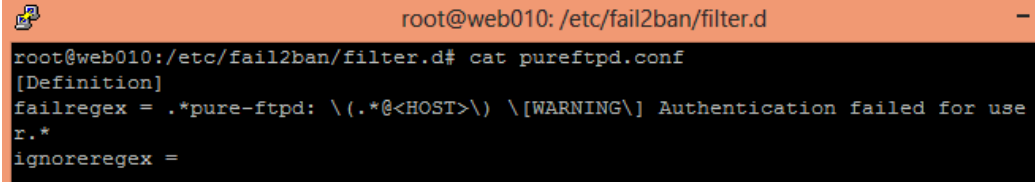
The next applications installed were Jailkit and fail2ban. Jailkit was configured later by ISPCConfig. However PureFTPd was set to be monitored by fail2ban. For that reason, a file named jail.local (located at /etc/fail2ban/) was created. The content of the file can be seen in the in the Figure 6.



```
root@web010: /etc/fail2ban
root@web010:/etc/fail2ban# cat jail.local
[pureftpd]
enabled = true
port = ftp
filter = pureftpd
logpath = /var/log/syslog
maxretry = 3
```

Figure 6. Contents of the created file /etc/fail2ban/jail.local.

A filter file named pureftpd.conf (located at etc/fail2ban/filter.d/) was also created and can be seen in the Figure 7. /4, 25-26/

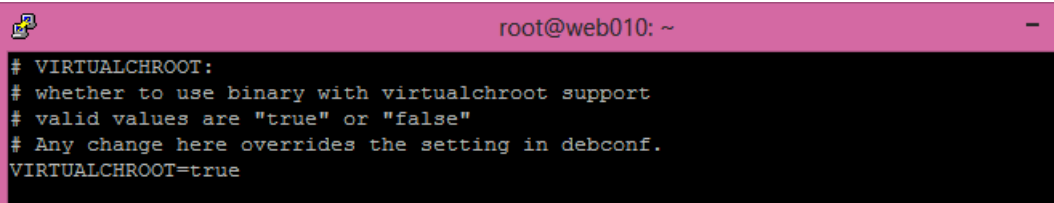


```
root@web010: /etc/fail2ban/filter.d
root@web010:/etc/fail2ban/filter.d# cat pureftpd.conf
[Definition]
failregex = .*pure-ftp: \(.*@<HOST>\) \[WARNING\] Authentication failed for use
r.*
ignoreregex =
```

Figure 7. Contents of the created file /etc/fail2ban/ filter.d/ pureftpd.conf.

Furthermore according the Figure 8, the virtualchroot is set to be true in the file named *pure-ftp-common* under /etc/default directory. This setting was useful

when a symlink was created for both SquirrelMail and phpMyadmin. This can allow users to follow these symlinks. /4, 55/



```

root@web010: ~
# VIRTUALCHROOT:
# whether to use binary with virtualchroot support
# valid values are "true" or "false"
# Any change here overrides the setting in debconf.
VIRTUALCHROOT=true

```

Figure 8. Edited version of the file /etc/default/pure-ftpd-common.

The last step is the installation and configuration of ISPConfig. The Server1: web010.multitronic is the master server. Although other servers were also running ISPConfig, only the master server was showing ISPConfig web interface. But it was important that other instances of MySQL should connect to the MySQL node on the master server. For that reason MySQL root user records for other servers (hostname and IP address) were added to the master database as shown in the Frame 2 /4, 29/

```

CREATE USER 'root'@'194.197.222.67' IDENTIFIED BY '*****';
GRANT ALL PRIVILEGES ON *.* TO 'root'@'194.197.222.67' IDENTIFIED BY '*****' WITH GRANT OPTION
MAX_QUERIES_PER_HOUR 0 MAX_CONNECTIONS_PER_HOUR 0
MAX_UPDATES_PER_HOUR 0 MAX_USER_CONNECTIONS 0 ;

CREATE USER 'root'@'mail2.multitronic.fi' IDENTIFIED BY '*****';
GRANT ALL PRIVILEGES ON *.* TO 'root'@'mail2.multitronic.fi' IDENTIFIED BY '*****' WITH GRANT OPTION
MAX_QUERIES_PER_HOUR 0 MAX_CONNECTIONS_PER_HOUR 0
MAX_UPDATES_PER_HOUR 0 MAX_USER_CONNECTIONS 0 ;

```

Frame 2. MySQL root user records queries

The MySQL queries shown in the Frame 2 applied to the mail server. However the same queries were used for other servers after changing the IP addresses and the name of the servers.

Next was to download and install the latest version of ISPConfig (ISPConfig 3.0.5) from sourceforge with the following link:

<http://sourceforge.net/projects/ispconfig/files/latest/download?source=directory>

After the installation the application is configured with Multitronic details. During the configuration, a database was created. The Frame 3 showed the services that were configured by the ISPConfig installer by answering n (for no) and y (for yes).

```
Full qualified hostname (FQDN) of the server, eg server2.domain.tld
[web.multitronic.fi]: <-- web010.multitronic.fi
Shall this server join an existing ISPConfig multiserver setup (y,n) [n]:  n
Configure Mail (y,n) [y]: <-- n
Configure FTP Server (y,n) [y]: <-- y
Configure DNS Server (y,n) [y]: <-- n
Configure Apache Server (y,n) [y]: <-- y
Configure Firewall Server (y,n) [y]: <--y
Install ISPConfig Web-Interface (y,n) [y]: <--y
```

Frame 3. Services configured by ISPConfig on the web server.

It should be observed that among the services or servers available, only Jailkit, FTPserver, Apache Server, and Firewall Servers were configured. /4, 25/

After this the webmail (SquirrelMail) was installed. This webmail needed to run with dovecot which is an open source IMAP and POP3 email server. Dovecot was configured later by the SquirrelMail installer as seen in this portion of the configuration file of SquirrelMail in the Frame 4.

```
Please select your IMAP server:
bincimap = Binc IMAP server
courier  = Courier IMAP server
cyrus    = Cyrus IMAP server
dovecot  = Dovecot Secure IMAP server
exchange = Microsoft Exchange IMAP server
hmailserver = hMailServer
macosx   = Mac OS X Mailserver
mercury32 = Mercury/32
uw       = University of Washington's IMAP server
gmail    = IMAP access to Google mail (Gmail) accounts

quit     = Do not change anything
Command >> <-- dovecot
```

Frame 4. Configuration file with Dovecot server selected.

After the installation, some Apache configuration files were configured in order to use SquirrelMail from within ISPConfig. To do that a symlink called Squirrelmail.conf was created under */etc/apache2/conf.d/* and pointed to */etc/SquirrelMail/apache.conf* with the following script

```
cd /etc/apache2/conf.d/
ln -s ../SquirrelMail/apache.conf SquirrelMail.conf
/etc/init.d/apache2 reload
```

The file named */etc/apache2/conf.d/SquirrelMail.conf* shown in the Frame 5 was also edited by adding the following lines of code

```

value include_path .AddType application/x-httpd-php .php
    php_flag magic_quotes_gpc Off
    php_flag track_vars On
    php_admin_flag allow_URL_fopen Off
    php_value include_path .
    php_admin_value upload_tmp_dir /var/lib/SquirrelMail/tmp
    php_admin_value open_basedir

/usr/share/SquirrelMail:/etc/SquirrelMail:/var/lib/SquirrelMail:/etc/hostna
me      :/etc/mailname

```

Frame 5. /etc/apache2/conf.d/SquirrelMail.conf edited file.

In these lines of code the *magic_quote* flag was set to *off* so that the data coming to the PHP is not escaped automatically. This should be done rather at runtime. The *allow_URL_open* flag was also set to *off* to prevent any code injection vulnerability.

After that, a directory (*/var/lib/SquirrelMail/tmp*) owned by the user *www-data* was created and Apache is reloaded.

At this level SquirrelMail can be accessed from the web browser by typing:
<https://web010.multitronic.fi:8080/SquirrelMail>
<https://194.197.222.65:8080/SquirrelMail>.

But it will be convenient to use *webmail* as an alias than *SquirrelMail*. To fix that problem, the following lines of code are added to *etc/apache2/conf.d/SquirrelMail.conf* file as shown in the Frame 6. /4, 55-60/

```

Alias /SquirrelMail /usr/share/SquirrelMail

Alias /webmail /usr/share/SquirrelMail [...]

```

Frame 6. etc/apache2/conf.d/SquirrelMail.conf edited file

After reloading Apache once again, the SquirrelMail webmail can be opened with these URLs:

`https://web010.multitronic.fi:8080/webmail`

`https://194.197.222.65:8080/webmail.`

Some configurations of the master server web010.multitronic.fi are shown in Appendix 4.

5.2.4 Installation of the Server 2 (mail server): mail2.multitronic.fi

The installation of the mail server is similar to the one of the web server with little variation. After the Hosts files were edited and the system clock synchronized, postfix, dovecot and MySQL were installed with a single command:

```
apt-get -y install postfix postfix-mysql postfix-doc mysql-client mysql-  
server openssl getmail4 rkhunter binutils dovecot-imapd dovecot-pop3d
```

Next is the installation of some antivirus (amavisd-new, SpamAssassin, and ClamAV) with the next script: /4, 30/

```
apt-get -y install amavisd-new spamassassin clamav clamav-daemon zoo  
unzip bzip2 arj nomarch lzop cabextract apt-listchanges libnet-ldap-perl  
libauthen-sasl-perl clamav-docs daemon libio-string-perl libio-socket-ssl-  
perl libnet-ident-perl zip libnet-dns-perl
```

It should be possible later for ISPConfig3 to run the PHP-based shell script. For that reason the command line version of PHP was installed

```
apt-get -y install php5-cli php5-mysql php5-mcrypt mcrypt
```

The next task was to install and configure mailman (according to ISPConfig manual). During its installation, a first mailing list called mailman was created with the email and password of the administrator. /4, 31/

At this stage ISPConfig3 was once again installed. During this installation, the only service that was configured was the Firewall Server. The configuration of the mail server is done later when the mail client (SquirrelMail) is installed.

Some configurations of mail2.multitronic.fi server are shown in Appendix 5.

5.2.5 Installation of the Server 3 (database server): db2.multitronic.fi

After the basic settings are done both MySQL client and server were installed. This is followed by the installation of the command line version of PHP and fail2ban. Later ISPConfig3 was installed. Here also only the Firewall Server was configured by the ISPConfig installer. /4, 33-35/

Some configurations of db2.multitronic.fi server are shown in the Appendix 6.

5.2.6 Installation of the Server 4 and Server 5: (DNS server) ns3.multitronic.fi and ns4.multitronic.fi

Both DNS servers have the same installation scripts as well as the same configuration. They were installed like the Database server. But there was an additional server called BIND DNS installed. Only this server was configured by ISPConfig. /4, 36-40/

Some configurations of ns3.multitronic.fi and ns4.multitronic.fi servers are shown in Appendix 7.

6 MIGRATION OF FILES FROM OLD SERVERS TO ISP-CONFIG

The next task was to migrate some clients from the old servers owned by Multitronic to the new ones installed

6.1 Clients Migration

Multitronic has hundreds of clients whose WebPages, emails, virtual servers they are hosting. With the implementation of the new control panel, it is therefore important to migrate these existing customers to the newly installed ISPConfig.

This phase of the project consisted of two things:

- Planning the migration: this is done by preparing a script that has to take care of the migration.
- Choosing the clients and the services that can be migrated now. The idea was to migrate only some of the clients and services in order to see how the new server handles them. This will be tested for a few days and even months. If everything goes ahead smoothly all other customers and services will be migrated.

A few things should be taken into account as far as the migration is concerned. The schema of almost the clients might look like this:

- Client 1 with website services:
 - Domains: DNS, Secondary DNS
 - Mail: Email users, Email aliases
 - Web site: FTP account
- Client 2 with virtual server services

The first phase of the transfer involved the migration of few clients and their detail from the old servers to the new one. The following ISPConfig remote API scripts were used:

- Migrate.php: This script takes care of the migration.

- Soap_config.php.

A file named DB.php is also used in order to link the Multitronic client's database.

But before the migration is made possible, a remote user must be created inside ISPCConfig. His login information is used to connect to the remote servers.

The complete script for the migration.php is in Appendix 8.

6.2 Domain Name Migration

Here a domain name is migrated from another hosting panel (from a company called iPage in USA) under ISPCConfig. The domain name used is creein.com. It was directed to two name servers: ns1.yourwebhosting and ns2.yourwebhosting. Prior to the migration the owner of the domain has to update the name server to the ISPCConfig name servers (ns3.multitronic.fi and ns4.multitronic.fi).

The transfer or change of name server was ready after 24h according to the settings of ipage.com name servers.

7 TEST RESULT AND ANALYSIS

7.1 Test, Result and Analysis Planning

At this stage of the project, the focus was to check if ISPCConfig3 worked perfectly and could be used in the production network without any problem. The first thing to check was to see if all installed servers run smoothly. Server security and protection tools were tested and analysed.

After that it was checked if clients and domain name were moved successfully from remote servers to ISPCConfig. Next is to see if websites and emails accounts could be created and run on the ISPCConfig. During the test, results obtained were be thoroughly analysed.

7.2 Testing Servers

The objective here was to see if all the five servers are installed and working properly.

7.2.1 Testing Servers Setting in ISPCConfig

The first thing to do was to check the settings of the servers and the main task each of them perform. A summary of their main task is configured in the panel through:

```
System> Server System
```

After the settings, the state of all servers can be seen in the Figure 9. At the left side under the Service tab there is a list of all other services and tools that can be used.

The screenshot shows the ISPConfig interface with the 'Server' configuration page. The left sidebar contains navigation menus for User Management, System, Interface, Apps & Addons, and Language Editor. The main content area shows a table of servers with the following data:

Name	Mail	Web	DNS	File	DB	VServer
web010.multitronic.fi	0	1	0	1	0	0
mail2.multitronic.fi	1	0	0	0	0	0
db2.multitronic.fi	0	0	0	0	1	0
ns3.multitronic.fi	0	0	1	0	0	0
ns4.multitronic.fi	0	0	1	0	0	0

Figure 9. Setting of the Services on the Servers.

Next was the configuration of individual servers. A typical example is how each and every server can be configured. Below in the Figure 10 was an example a configuration of the Database server (Server 3).

The screenshot shows the ISPConfig interface with the 'Server Config' page for the database server. The left sidebar contains navigation menus for User Management, System, Interface, Apps & Addons, and Language Editor. The main content area shows the configuration options for the server:

Server	Mail	Getmail	Web	DNS	FastCGI	Jailkit	vlogger	Cron	Rescue
db2.multitronic.fi									

Network Configuration The network configuration option is only available for Debian and Ubuntu Servers. Do not enable this option if your network interface is not eth0.

IP Address: 194.197.222.69

Netmask: 255.255.255.0

Gateway: 0.0.0.0

Hostname: db2.multitronic.fi

Nameservers: 8.8.8.8.8.4.4

Firewall: bastille

Loglevel: Errors

Backup directory: /var/backup

Backup mode: Backup all files in web directory as root

Figure 10. Example of the Configuration of the Database server

These examples and tests made on the servers showed they were working without problem. This explains why during the installation the mode of ISPConfig that

was selected is expert mode instead of standard mode. The reason was that with the expert mode the installer gives more configuration option. These values could be changed to suit the need of each server. Some of these options or values were already set as a default in the standard mode. (The standard mode is mostly used for the single server-setup). This was seen during the installation of the servers.

Frame 7 below showed a portion of the configuration file of the web server.

```

Installation mode (standard,expert) [standard]: <-- expert
.....
MySQL server hostname [localhost]: <-- localhost
MySQL root username [root]: <-- root
MySQL root password []: <-- *****
.....
Shall this server join an existing ISPCconfig multiserver setup (y,n) : <-- n
MySQL master server hostname []: <-- web010.multitronic.fi
.....

```

Frame 7. Portion of the Configuration file of the web server.

Furthermore, it should be noted that the web server (web010.multitronic.fi) is the master server. During the installation these two questions were asked for all the servers:

Shall this server join an existing ISPCconfig multiserver setup (y,n) : <-- n

The answer to the first question is NO for the web server because this server is the master server. It was installed at the first position and could not join any existing one. But since all other servers were installed later the answer is Yes since they have to join an existing server and communicate with it.

Though ISPCconfig was installed on all the servers it is only on the web server that its web interface is configured. That is the reason why the URL of the whole application carries the IP address of the web server (194.197.222.65). Other servers are working at the background

The rest of the configurations were almost the same. The table 2 below showed the available services on the servers and those who were configured. (N for Not configured and Y for Configured)

Table 2. Configuration of the services on the five servers.

Services or Software	Web Server	Mail Server	Database Server	ns server 1	ns server 2
Configure Mail	N	N	N	N	N
Configure Jailkit	Y	N	N	N	N
Configure FTP Server	Y	N	N	N	N
Configure DNS Server	N	N	N	Y	Y
Configure Apache Server	Y	N	N	N	N
Configure Firewall Server	Y	Y	Y	Y	Y
Install ISPConfig Web-Interface	Y	N	N	N	N

The table clearly showed that only the Firewall was configured for all servers in order to enforce security measures. It also showed that the mail server was not configured for none of the servers. Because this configuration is done later after the mail client (SquirrelMail) is installed.

7.2.2 Testing Server1: Web Server

The tests to be performed here is to see if the control panel is there and if it could be accessed via the web browser. The following addresses are used:

`http(s)://web010.multitronic.fi:8080`

`http(s)://194.197.222.65:8080`

From the web browser it can be seen that ISPConfig is correctly installed and the admin can login and have access to the dashboard as shown by the Figure 11.

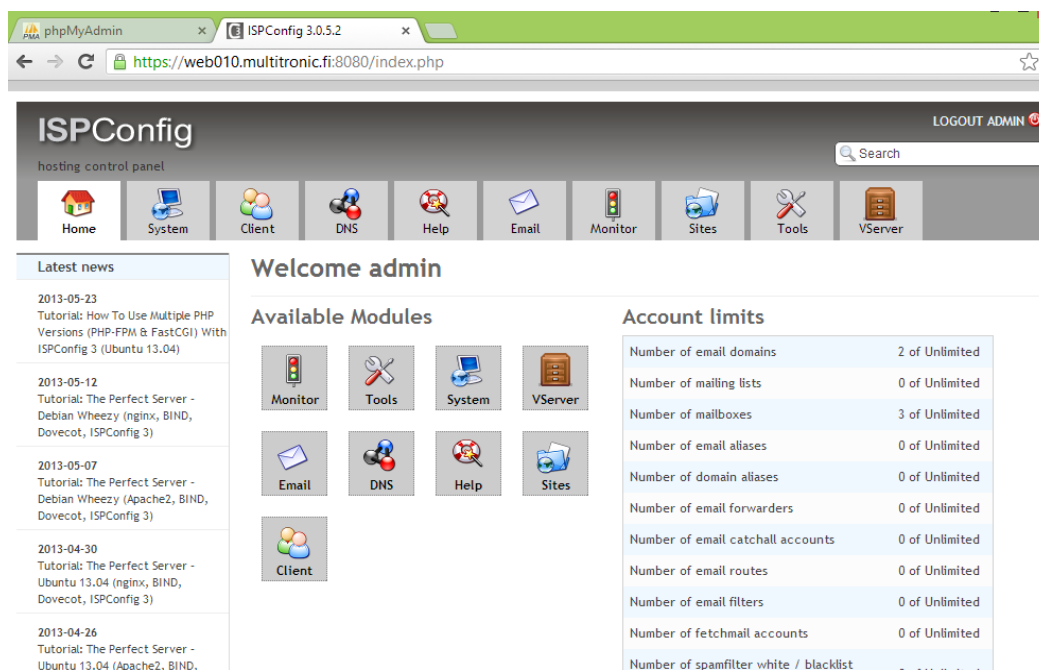


Figure 11. Admin dashboard after login.

The second thing to check was if the system users such as admin, reseller and client can be created.

The administrator is the default user having the highest permission. This account is created automatically when ISPConfig is installed. The admin can create other admin with the same right or reduced rights.

From his account, the admin can create other users like a reseller and a client.

- Creating and testing a Reseller account

It is created by going to:

Client > Reseller > Add Reseller

The form that appears is filled as seen in the Figure 12. The first tab in the form (Address) showed the necessary details and information about the reseller.

The screenshot shows the ISPConfig 3.0.5.2 web interface. The browser address bar shows the URL <https://web010.multitronic.fi:8080/index.php#>. The main navigation bar includes icons for Home, System, Client, DNS, Help, Email, Monitor, Sites, and Tools. A sidebar on the left contains a menu with the following items: Clients (Edit Client, Add Client, Edit Client-Templates), Resellers (Edit Reseller, Add Reseller), and Messaging (Edit Client Circle, Send Email). The main content area is titled 'Reseller' and has two tabs: 'Address' (selected) and 'Limits'. The 'Address' tab contains the following form fields:

Company name	<input type="text" value="lodelnet"/>
Contact name*	<input type="text" value="lotchi"/>
Customer No.	<input type="text"/>
Username*	<input type="text" value="lotchi"/>
Password	<input type="password"/> Generate Password
Password strength	
Repeat Password	<input type="password"/>
Language	<input type="text" value="en"/>
Theme	<input type="text" value="default"/>
Street	<input type="text"/>
ZIP	<input type="text"/>
City	<input type="text"/>
State	<input type="text"/>
Country	<input type="text" value="Togo"/>
Telephone	<input type="text"/>

Figure 12. Form to create a Reseller.

From here the admin can use the second tab (Limits) to configure the permission and set the limits that should be given to the reseller as shown in the Figure 13.

Figure 13. Form to set the limits to the reseller.

With the login information given to the reseller he could also login to the system.

After login, the reseller's interface looked similar to the one of the administrator as shown by the Figure 14 apart from some tabs that were missing.

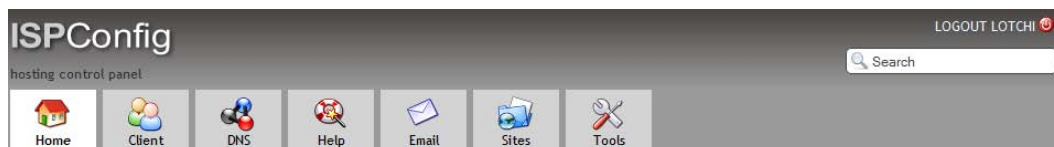


Figure 14. Reseller dashboard .

The major permissions of the reseller are

- Create and manage clients
- Read client's statistics
- Create and manage WebPages
- Create DNS entries
- Creating and testing a Client account

- Creating and testing a Client account

The client is created like the reseller. The following tab was used

Client > Clients > Add Clients

The creation of the clients and his dashboard was similar to the one of the reseller as shown in the **Figure 10, Figure 11 and Figure 12.**

By allowing all registered clients and reseller to login to the ISPConfig, an opportunity is given them to manage their own basic settings and services. Depending on the limit given by the administrator, a client can create a sub-domain as well as creating and managing their own databases. The ISPConfig control panel is user friendly and can be easily used by a reseller or client with limited computer knowledge.

7.2.3 Testing Server2: Mail Server

The objective here is to check if the SquirrelMail (webmail) was installed successfully and working with ISPConfig. An email account was created and tested by sending and receiving emails.

The following URLs can be used to access the webmail.

<https://web010.multitronic.fi:8080/SquirrelMail>

<https://194.197.222.65:8080/SquirrelMail>

From ISPConfig control panel an email account can be created as follows:

Email > Email Box > Add new Mailbox

The result can be seen in the Figure 15 below.

ISPConfig 3.0.5.2

https://web010.multitronic.fi:8080/#

ISPConfig

hosting control panel

Home System Client DNS Help Email Monitor Sites Tools

Email Accounts

- Domain
- Domain Alias
- Email Mailbox
- Email Alias
- Email Forward
- Email Catchall
- Email Routing

Mailing List

- Mailing List

Spamfilter

- Whitelist
- Blacklist
- User / Domain
- Policy

Fetchmail

- Fetchmail

Statistics

Mailbox

Mailbox Autoresponder Mail Filter Custom Rules

Name (Optional)

Email * Alias Domain

Password [Generate Password](#)

Password strength

Repeat Password

Quota (0 for unlimited) MB

Send copy to (Optional)

Spamfilter

Enable Receiving

Disable IMAP

Disable POP3

Figure 15. Form to create an Email.

An email kodjovi@patrikhill.com was created. This email user created under *patrikhill.com* does not need to access his mail box via Multitronic main webmail address (like <https://web010.multitronic.fi:8080/webmail>). He can do it by using his own domain (<http://patrikhill.com/webmail/>).

The Figure 16 below showed the webmail interface once a user (example: kodjovi@patrikhill.com) has login.

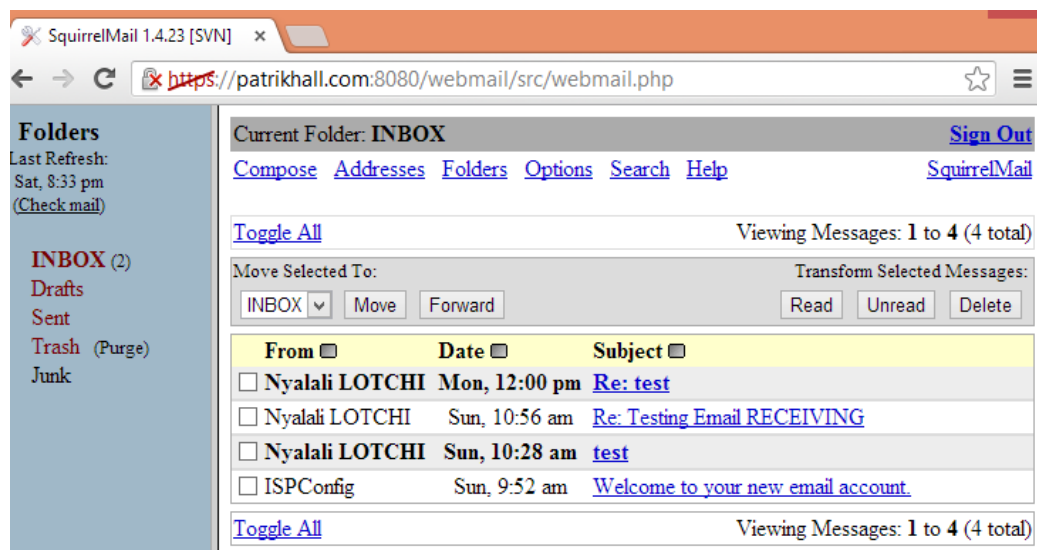


Figure 16. SquirrelMail interface after login.

An email was sent from kodjovi@patrikhall.com to *****@yahoo.fr (with username Nyalali LOTCHI). It arrived in the Yahoo box successfully as shown by the Figure 17 below.

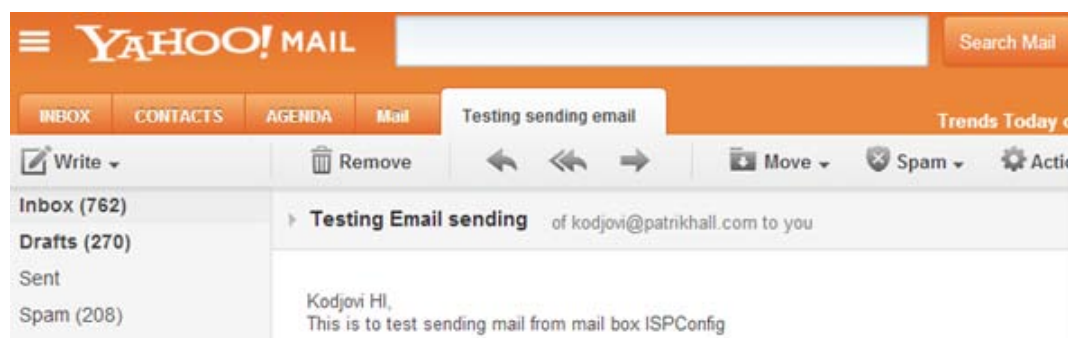


Figure 17. Yahoo box showing Email received from kodjovi@patrikhal.com.

Next was to send a reply from the yahoo box (*****@yahoo.fr) to the kodjovi@patrikhall.com.

The inbox of kodjovi@patrikhall.com displayed in the Figure 16 showed that at least three emails were received from *****@yahoo.fr with username Nyalali LOTCHI.

7.2.4 Testing Server3: Database Server

And important feature showing the existence of the DB server is the phpMyAdmin. During the installation of MySQL a root user was created with a password. This login information is used to login to the phpMyAdmin (as shown by the Figure 18) panel through the following URL `https://web010.multitronic.fi:8080/phpMyAdmin/`

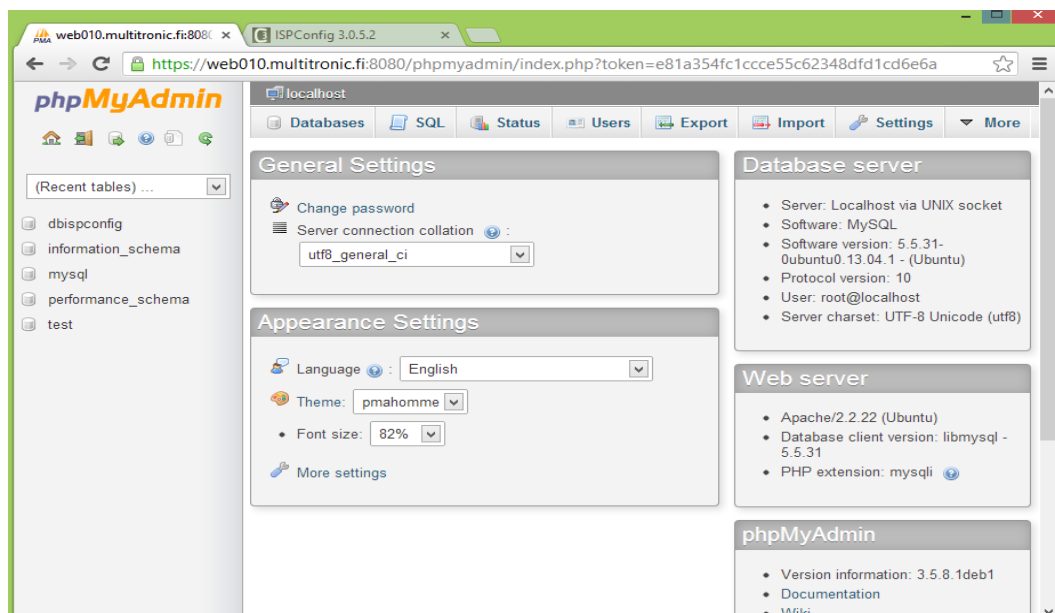


Figure 18. Interface of phpMyAdmin after login.

Furthermore a database user can be created as shown by the Figure 19 by going to:



Figure 19. Form to create a database.

Once the database user is created a database (c1patrik_data) can also be created with success as displayed in the **Figure 20**.

```
mysql> show databases;
+-----+
| Database |
+-----+
| information_schema |
| c1patrik_data |
| dbispconfig |
| mysql |
| performance_schema |
| test |
+-----+
6 rows in set (0.00 sec)
```

Figure 20. List from db2.multitronic.fi's shell showing new database (c1patrik_data).

7.2.5 Testing Server4 and Server 5: DNS servers

The aim here was to see if these name servers are recognized by ISPConfig. Some domain names were created. After that it was verified if these domain names were properly resolved over internet. The first step was to create a DNS Zone like the one displayed in the Figure 21 by going to:

```
DNS > Add DNS-Zone > DNS Zone Wizard
```

DNS-Wizard	
Add DNS-Zone	
Zone-File Import	
Templates	
DNS	
Zones	
Secondary DNS	
Secondary DNS-Zones	

DNS Zone	
DNS Zone	
Records	
Server	ns3.multitronic.fi
Client	patrik :: :: Patrik
Zone (SOA)	patrik.hall.com. e.g. domain.tld
NS	ns3.multitronic.fi. e.g. ns1.domain.tld
Email	patrik.hall.fi. e.g. webmaster@domain.tld
Refresh	7200 Seconds
Retry	540 Seconds
Expire	604800 Seconds
Minimum	86400 Seconds
TTL	3600 Seconds
Allow zone transfers to these IPs (comma separated list)	194.197.222.71
Also Notify	
Update ACL	
Active	<input checked="" type="checkbox"/>

Figure 21. Form to create a DNS zone.

Adding a client's domain was done immediately after a client was created. If not, it will be impossible to create a web site, a database or an email address. The domain name is an identification string that characterizes each customer over the internet.

7.3 Testing Security features

Since the objective of this project is to use this ISPConfig in the production line, a special attention has been paid to the security setups. Some tools and antivirus were installed and configured. They can be seen under the Monitor tab:

Monitor > Logfiles

Each of them plays a specific role. A few of them are mentioned below:

- Fai2ban

Its role is to prevent an intrusion on the server by observing login attempts to services such as SSH, FTP, SMTP, Apache, etc. If it noticed many failed login attempts from the same IP address or host, fail2ban prevents any new attempt. The Figure 22 below showed a result of a fail2ban log from the ISPCConfig.

The screenshot shows the ISPCConfig interface with a sidebar on the left containing navigation options like 'System State (All Servers)', 'Server to Monitor', 'Hardware Information', 'Server State', and 'Logfiles'. The main content area is titled 'Fail2Ban Log (Server : db2.multitronic.fi)' and shows log data from 2013-05-31 23:50. The log entries include:

```

2013-05-30 08:48:43,006 fail2ban.server : INFO Changed logging target to /var/log/fail2ban.log for Fail2ban v0.8.7
2013-05-30 08:48:43,007 fail2ban.jail : INFO Creating new jail 'ssh'
2013-05-30 08:48:43,077 fail2ban.jail : INFO Jail 'ssh' uses pyinotify
2013-05-30 08:48:43,094 fail2ban.jail : INFO Initiated 'pyinotify' backend
2013-05-30 08:48:43,096 fail2ban.filter : INFO Added logfile = /var/log/auth.log
2013-05-30 08:48:43,097 fail2ban.filter : INFO Set maxRetry = 6
2013-05-30 08:48:43,098 fail2ban.filter : INFO Set findtime = 600
2013-05-30 08:48:43,099 fail2ban.actions: INFO Set banTime = 600
2013-05-30 08:48:43,144 fail2ban.jail : INFO Jail 'ssh' started
2013-05-30 08:52:02,427 fail2ban.filter : WARNING Determined IP using DNS Reverse Lookup: a91-156-195-211.elisa-laaajakaista.fi = ['91.156.195.211']
2013-05-30 08:52:02,431 fail2ban.filter : ERROR Unable to get failures in /var/log/ispcnfig
2013-05-30 08:53:24,033 fail2ban.filter : WARNING Determined IP using DNS Reverse Lookup: li234-90.members.linode.com = ['173.255.224.90']
2013-05-30 08:53:40,963 fail2ban.filter : WARNING Determined IP using DNS Reverse Lookup: li234-90.members.linode.com = ['173.255.224.90']
2013-05-30 15:16:35,902 fail2ban.actions: WARNING [ssh] Ban 211.87.176.89
2013-05-30 15:26:36,580 fail2ban.actions: WARNING [ssh] Unban 211.87.176.89
2013-05-30 19:02:07,535 fail2ban.filter : WARNING Determined IP using DNS Reverse Lookup: dixonf.lnk.telstra.net = ['110.142.72.177']
2013-05-30 19:02:20,963 fail2ban.filter : WARNING Determined IP using DNS Reverse Lookup: dixonf.lnk.telstra.net = ['110.142.72.177']
2013-05-30 19:02:27,949 fail2ban.actions: WARNING [ssh] Ban 110.142.72.177
2013-05-30 19:12:28,642 fail2ban.actions: WARNING [ssh] Unban 110.142.72.177
2013-05-31 01:11:27,972 fail2ban.filter : WARNING Determined IP using DNS Reverse Lookup: s11.n128.n172.n72.static.myhostcenter.com = ['72.172.128.11']
2013-05-31 01:11:35,984 fail2ban.filter : WARNING Determined IP using DNS Reverse Lookup: s11.n128.n172.n72.static.myhostcenter.com = ['72.172.128.11']
2013-05-31 11:10:33,048 fail2ban.actions: WARNING [ssh] Ban 119.36.186.44
2013-05-31 11:20:33,760 fail2ban.actions: WARNING [ssh] Unban 119.36.186.44
2013-05-31 11:50:24,724 fail2ban.actions: WARNING [ssh] Ban 37.247.102.226
  
```

Figure 22. fail2ban log file

Figure 22 above clearly showed the server being monitored (db2.multitronic.fi) as well as the log file on 31st May 2013 at 23h50. A closer look at the log file showed an IP 119.36.186.44 which was banned and unbanned after exactly 10 minutes. This IP was unbanned maybe after several unsuccessful attempts just due to a wrong login. The banning time is not permanent. It lasted for only 10 minutes in order to allow this same IP to make a new attempt again.

However, this protection cannot prevent the server from a distributed brute force attack. And also for the mean time fail2ban does not support IPv6.

- Antivirus

A free cross-platform antivirus named ClamAV was installed and running. The logs of this antivirus are similar to the one of fail2ban shown in the Figure 22. The same result can also be seen from the shell as shown by the Figure 23.

```
root@web010:/var/lib/squirrelmail# clamscan data/
data/me@patrikhall.com.pref: OK
data/lotchi@creein.com.pref: OK
data/kodjovi@creein.com.abook: Empty file
data/kodjovi@creein.com.pref: OK
data/kodjovi@patrikhall.com.abook: Empty file
data/me@patrikhall.com.abook: Empty file
data/lotchi@creein.com.abook: Empty file
data/kodjovi@patrikhall.com.pref: OK

----- SCAN SUMMARY -----
Known viruses: 2343991
Engine version: 0.97.8
Scanned directories: 1
Scanned files: 4
Infected files: 0
Data scanned: 0.00 MB
Data read: 0.00 MB (ratio 0.00:1)
Time: 6.630 sec (0 m 6 s)
root@web010:/var/lib/squirrelmail#
```

Figure 23. Scan summary of a directory called data.

Figure 23 showed how a directory called data is scanned. This directory contained all the email boxes. The summary showed the number of directories and files scanned as well the final result.

By means of these logs the administrator can be aware of any intrusion or malicious activities.

7.4 Testing Migrated clients

Before the migration was done, a remote user was created in ISPCConfig by going to:

```
System >> User Management > Remote User
```

The username created (*migrate*) and the password created were used to connect to the remote servers for the migration. After that a few clients were migrated from the old servers to the new one with success by means of ISPCConfig remote API scripts. When the scripts were run the result of the transfer can be seen in the ISPCConfig panel as shown in the Figure 24.

Clients

ID	Company name	Contact name	Customer No.	Username	City	Country
1		Patrik Hall		patrik		Finland
3	Ca B			ing	VAASA	Finland
5	Karit			rbod	VASA	Finland

Figure 24. Portion of list of some migrated clients to ISPCConfig.

It could be observed from the result that the clients were migrated with their details like company name, contact name, customer No, City and Country. These details were the same used on the old server and kept in Multitronic database. That is why the file named *migrate.php* included both *DB.php* and *soap_config.php* as shown by the Frame 8 below. The same file showed some parameters like *country_name*, *customer_no* and etc which were taking care of the customer's details.

```

.....
require_once "DB.php";
require_once "soap_config.php";
.....

if ($temp_record === FALSE) {
    /* Set the function parameters.
    $random_rs_id = 1;
    $params = array(
        'company_name' => $customer_data['icustomer_company'],
        'contact_name' => $customer_data['icustomer_name'],
        'customer_no' => $customer_id,
        .....
        'country' => $customer_data['icustomer_countryid'],
        'telephone' => $customer_data['icustomer_phone'],
        'mobile' => ",

```

Frame 8. Portion of ISPConfig migration API called migrate.php.

But the migration was made possible only after ISPconfig was connected to the remote servers (Multitronic's old servers). The connection was made possible by *soap_config.php* script. The entire script is shown below in the Frame 9.

```

<?php

$username = '*****';
$password = '*****';

$soap_location = 'https://web010.multitronic.fi:8080/remote/index.php';
$soap_uri = 'https://web010.multitronic.fi:8080/remote/';
?>

```

Frame 9. ISPConfig migration API soap_config.php .

The username and password used here are the one of the remote user previously created. The code line above showed the `soap_location` and the `soap_uri`. The `soap_location` is the SOAP server to where the request of the migration was sent to whereas the `soap_uri` is the name space of the SOAP service.

8 CONCLUSIONS

During this project a hosting and multi-server control panel named ISPCConfig was implemented for Multitronic. The need behind this project was to improve their web hosting services as well as their server management system.

At the end of the implementation various test were made to show that the system was working perfectly. It was also possible to migrate some clients with their details from the old server to the new one.

Security features were also taken into account. The applications installed involve some antivirus and tools that can ban unwanted IPs.

Since this project was made on a company server it was important to do a lot of test before deciding to make the final implementation. For that reason several implementations were made on three versions of Linux operation system.

However there were some limitations. It was planned to move all clients, databases, FTP accounts and Emails from the old servers to the new one (ISPCConfig), but this could not be done. Only few clients with their details were migrated. Because although the installed ISPCConfig works properly, it should be tested for a longer period before all other clients and services are migrated to it.

This project could still be expanded. There are a lot features and services provided by ISPCConfig that need to be studied. More security features could be added such as mpm-itk in order to prevent any intrusion from a web site already hosted on the servers.

Other application and tools that are used separately at Multitronic could be integrated into ISPCConfig in the future. Some of them are their billing module and spam filter application (clean mail).

REFERENCES

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- /3/ Description about ISPConfig. ISPConfig official Webpage. Accessed 15/05/2013 <http://www.ispconfig.org/>.
- /4/ Falko, T. 2013. ISPConfig 3 Manual, Version 1.4, 11-19.
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LIST OF SERVERS AND THEIR ROLES AT MULTITRONIC

Multitronic Oy

- Network:

We have two public networks at Multitronic, 213.28.138.32/27 and 194.197.222.0/24... In the firewall, IPs in 213.28.138.32/27 network is mostly mapped to internal IP addresses, IPs in the 194.197.222.0/24 network is routed.

Internal IP addresses:

10.3.1.0/24	Office network
10.3.2.0/24	DMZ network for servers
10.3.4.0/24	Storage network

- Physical servers:

Vmware vSphere

- Servers for web and email hosting:

ns.multitronic.fi

IP address public	213.28.138.36
IP address private	10.3.2.10
Operating System	CentOS 5, 32-bit
Services	Master bind nameserver, chrooted

ns2.multitronic.fi

IP address public	213.28.138.37
IP address private	10.3.2.40
Operating System	CentOS 6, 32-bit
Services	Secondary bind nameserver

dream.multitronic.fi

IP address public	213.28.138.38
IP address private	10.3.2.1
IP address storage	10.3.4.1
Operating System	CentOS 6, 64-bit
Services	Time server, NFS server for web servers, Database for current hosting software, POP and IMAP server for old email system.

web001.multitronic.fi

IP address public	213.28.138.39
IP address private	10.3.2.100
IP address storage	10.3.4.100
Operating System	Fedora Core 1, extremely old

Services	Old email platform, web server.
----------	---------------------------------

web002.multitronic.fi

IP address public	213.28.138.43
IP address private	10.3.2.101
IP address storage	10.3.4.101
Operating System	Debian testing since 2006, extremely old
Services	GSM gateway and Nagios.

web004.multitronic.fi

IP address public	213.28.138.48
IP address private	10.3.2.103
IP address storage	10.3.4.103
Operating System	CentOS 5, 32-bit
Services	Web services, mysql

web005.multitronic.fi

IP address public	213.28.138.49
IP address private	10.3.2.104
IP address storage	10.3.4.104
Operating System	CentOS 4, 32-bit

Services	Web services, mysql, php 4
----------	----------------------------

web006.multitronic.fi

IP address public	194.197.222.10
Operating System	CentOS 5, 32-bit
Services	Ruby on Rails server

web007.multitronic.fi

IP address public	194.197.222.51
Operating System	CentOS 5, 32-bit
Services	Webserver, mysql

mail.multi24.net: Our main zimbra email server

IP address public	194.197.222.8
Operating System	CentOS 5, 64-bit
Services	Email collaboration

mail2.multi24.net: Zimbra Open Source edition

IP address public	194.197.222.7
Operating System	CentOS 5, 64-bit
Services	Email collaboration

mail3.multi24.net: Zimbra 8 beta testing.

IP address public	194.197.222.6
Operating System	CentOS 6, 64-bit
Services	Email collaboration

FULL LIST OF MANAGED SERVICES IN ISPCONFIG

- IPv4 support
- IPv6 support
- Websites tools
 - o Name-based and IP-based virtual hosts
 - o SSL websites
 - o SNI support, allows more than one SSL vhost per IP address
 - o CGI
 - o PHP (available PHP modes for Apache: mod_php, FCGI, CGI and SuPHP; for nginx: FCGI (PHP-FPM))
 - o Individual PHP settings per website
 - o SSI
 - o Ruby (Apache only)
 - o Python (Apache only)
 - o Rewrites/redirects
 - o Custom Apache/nginx directives
 - o Subdomains
 - o Alias domains
 - o Password-protected folders
 - o WebDAV
- FTP users
- MySQL databases
- Shell users (jailed and non-jailed), SFTP, SCP; password- and key-based logins
- Email
 - o SMTP
 - o POP3, IMAP, POP3S, IMAPS
 - o Email accounts
 - o Email aliases
 - o Spam filter

- Virus filter
- White lists
- Blacklists
- Header and body checks
- Auto responder
- Fetching emails from remote servers with get mail
- Mailman mailing lists
- DNS
 - DNS wizard for creating zones easily
 - Management of DNS zones and records
 - Import tool for BIND zone files
 - Supported record types: A, AAAA, ALIAS, CNAME, HINFO, MX, NS, PTR, RP, SRV, TXT
 - Master and slave DNS servers
- Virtualization (through OpenVZ)
- Firewall
- Webalizer & AWStats statistics
- Quota/Traffic Limits
 - Harddisk quota
 - Mail quota

SOME CONFIGURATIONS OF THE SINGLE SERVER

- Source: ISPConfig 3 Manual, Version 1.4 (pages 11-20) and <http://www.howtoforge.com/perfect-server-debian-wheezy-apache2-bind-dovecot-ispconfig-3>

- Configurations done during the generating the SSL Certificate

Country Name (2 letter code) [FI]: <-- "FI").
 State or Province Name (full name) [Vaasa]: <-- Vaasa.
 Locality Name (eg, city) [Vaasa]: <-- Enter your City.
 Organization Name (eg, company) [Multitronic Oy]: <-- Multitronic Oy
 Organizational Unit Name (eg, section) [IT Department]: <-- Enter your Organizational Unit Name (e.g. "IT Department").
 Common Name (eg, YOUR name) []: <-- Enter the Fully Qualified Domain Name of the system (e.g. "ispconfig.multitronic.fi").
 Email Address [*****@yahoo.fr]: <-- Enter your Email Address.

- Some configurations done during the installation of ISPConfig

Select language (en,de) [en]: <-- ENTER

Installation mode (standard,expert) [standard]: <-- ENTER

Full qualified hostname (FQDN) of the server, eg server1.domain.tld [ispconfig.multitronic.fi]: <-- ENTER

MySQL server hostname [localhost]: <-- ENTER

MySQL root username [root]: <-- ENTER

MySQL root password []: <-- *****

MySQL database to create [dbispconfig]: <-- ENTER

MySQL charset [utf8]: <-- ENTER

Generating a 4096 bit RSA private key

```
.....++
.....++
writing new private key to 'smtpd.key'
-----
```

You are about to be asked to enter information that will be incorporated into your certificate request.

What you are about to enter is what is called a Distinguished Name or a DN. There are quite a few fields but you can leave some blank

*For some fields there will be a default value,
If you enter '.', the field will be left blank.*

Country Name (2 letter code) [FI]: <-- ENTER
 State or Province Name (full name) [Vaasa]: <-- ENTER
 Locality Name (eg, city) [Vaasa]: <-- ENTER
 Organization Name (eg, company) [Multitronic Oy]: <-- ENTER
 Organizational Unit Name (eg, section) [IT Department]: <-- ENTER
 Common Name (e.g. server FQDN or YOUR name) [ispconfig.multitronic.fi]: <--
 ENTER
 Email Address [*****@yahoo.fr]: <-- ENTER
 Configuring Jailkit
 Configuring Dovecot
 Configuring Spamassassin
 Configuring Amavisd
 Configuring Getmail
 Configuring Pureftpd
 Configuring BIND
 Configuring Apache
 Configuring Vlogger
 Configuring Apps vhost
 Configuring Bastille Firewall
 Configuring Fail2ban
 Installing ISPConfig
 ISPConfig Port [8080]: <-- ENTER

Do you want a secure (SSL) connection to the ISPConfig web interface (y,n) [y]:
 <-- ENTER

Generating RSA private key, 4096 bit long modulus

.....++
++

e is 65537 (0x10001)

*You are about to be asked to enter information that will be incorporated
 into your certificate request.*

What you are about to enter is what is called a Distinguished Name or a DN.

There are quite a few fields but you can leave some blank

For some fields there will be a default value,

If you enter '.', the field will be left blank.

Country Name (2 letter code) [FI]: <-- ENTER
 State or Province Name (full name) [Vaasa]: <-- ENTER
 Locality Name (eg, city) [Vaasa]: <-- ENTER
 Organization Name (eg, company) [Multitronic Oy]: <-- ENTER
 Organizational Unit Name (eg, section) [IT Department]: <-- ENTER
 Common Name (e.g. server FQDN or YOUR name) [ispconfig.multitronic.fi]: <--
 ENTER
 Email Address [*****@yahoo.fr]: <-- ENTER

*Please enter the following 'extra' attributes
to be sent with your certificate request*

A challenge password []: <-- ENTER

An optional company name []: <-- ENTER

SOME CONFIGURATIONS OF THE MULTI SERVER SETUP: THE WEB SERVER

- Source: ISPConfig 3 Manual, Version 1.4 (pages 21-29) and <http://www.howtoforge.com/multiserver-setup-with-dedicated-web-email-dns-and-mysql-database-servers-on-debian-squeeze-with-ispconfig-3>.

- Configurations done during the generating the SSL Certificate

Country Name (2 letter code) [FI]: <-- "FI".

State or Province Name (full name) [Vaasa]: <-- Vaasa.

Locality Name (eg, city) [Vaasa]: <-- Enter your City.

Organization Name (eg, company) [Multitronic Oy]: <-- MULTitronic Oy

Organizational Unit Name (eg, section) [IT Department]: <-- Enter your Organizational Unit Name (e.g. "IT Department").

Common Name (eg, YOUR name) []: <-- Enter the Fully Qualified Domain Name of the system (e.g. "web010.multitronic.fi").

*Email Address [*****@yahoo.fr]:* <-- Enter your Email Address.

- MySQL queries to create users

```
CREATE USER 'root'@'194.197.222.67' IDENTIFIED BY
*****;
GRANT ALL PRIVILEGES ON *.* TO 'root'@'194.197.222.67' IDENTIFIED BY ***** WITH GRANT OPTION
MAX_QUERIES_PER_HOUR 0 MAX_CONNECTIONS_PER_HOUR 0
MAX_UPDATES_PER_HOUR 0 MAX_USER_CONNECTIONS 0 ;
```

```
CREATE USER 'root'@'194.197.222.69' IDENTIFIED BY
*****;
GRANT ALL PRIVILEGES ON *.* TO 'root'@'194.197.222.69' IDENTIFIED BY ***** WITH GRANT OPTION
MAX_QUERIES_PER_HOUR 0 MAX_CONNECTIONS_PER_HOUR 0
MAX_UPDATES_PER_HOUR 0 MAX_USER_CONNECTIONS 0 ;
```

```
CREATE USER 'root'@'194.197.222.70' IDENTIFIED BY
*****;
GRANT ALL PRIVILEGES ON *.* TO 'root'@'194.197.222.70' IDENTIFIED BY ***** WITH GRANT OPTION
MAX_QUERIES_PER_HOUR 0 MAX_CONNECTIONS_PER_HOUR 0
MAX_UPDATES_PER_HOUR 0 MAX_USER_CONNECTIONS 0 ;
```

```

CREATE USER 'root'@'194.197.222.71' IDENTIFIED BY
*****;
GRANT ALL PRIVILEGES ON *.* TO 'root'@'194.197.222.71' IDENTIFIED BY ***** WITH GRANT OPTION
MAX_QUERIES_PER_HOUR 0 MAX_CONNECTIONS_PER_HOUR 0
MAX_UPDATES_PER_HOUR 0 MAX_USER_CONNECTIONS 0 ;

CREATE USER 'root'@'mail2.multitronic.fi' IDENTIFIED BY
*****;
GRANT ALL PRIVILEGES ON *.* TO 'root'@'mail2.multitronic.fi' IDENTIFIED BY ***** WITH GRANT OPTION
MAX_QUERIES_PER_HOUR 0 MAX_CONNECTIONS_PER_HOUR 0
MAX_UPDATES_PER_HOUR 0 MAX_USER_CONNECTIONS 0 ;

CREATE USER 'root'@'db.multitronic.fi' IDENTIFIED BY
*****;
GRANT ALL PRIVILEGES ON *.* TO 'root'@'db.multitronic.fi' IDENTIFIED BY ***** WITH GRANT OPTION
MAX_QUERIES_PER_HOUR 0 MAX_CONNECTIONS_PER_HOUR 0
MAX_UPDATES_PER_HOUR 0 MAX_USER_CONNECTIONS 0 ;

CREATE USER 'root'@'ns3.multitronic.fi' IDENTIFIED BY
*****;
GRANT ALL PRIVILEGES ON *.* TO 'root'@'ns3.multitronic.fi' IDENTIFIED BY ***** WITH GRANT OPTION
MAX_QUERIES_PER_HOUR 0 MAX_CONNECTIONS_PER_HOUR 0
MAX_UPDATES_PER_HOUR 0 MAX_USER_CONNECTIONS 0 ;

```

- Some configurations done during the installation of ISPConfig

```

Select language (en,de) [en]: <-- en
Installation mode (standard,expert) [standard]: <-- expert
Full qualified hostname (FQDN) of the server, eg server2.domain.tld
[web010.multitronic.fi]: <-- web010.multitroni.fi
MySQL server hostname [localhost]: <-- localhost
MySQL root username [root]: <-- root
MySQL root password []: <-- *****
MySQL database to create [dbispconfig]: <-- dbispconfig
MySQL charset [utf8]: <-- utf8
Shall this server join an existing ISPConfig multiserver setup (y,n) [n]: <-- n
Configure Mail (y,n) [y]: <-- n
Configure Jailkit (y,n) [y]: <-- y
Configure FTP Server (y,n) [y]: <-- y

```

Configure DNS Server (y,n) [y]: <-- n
Configure Apache Server (y,n) [y]: <-- y
Configure Firewall Server (y,n) [y]: <--y
Install ISPConfig Web-Interface (y,n) [y]: <--y
ISPConfig Port [8080]: <-- 8080
Enable SSL for the ISPConfig web interface (y,n) [y]: <-- y
Country Name (2 letter code) [FI]: <-- ENTER
State or Province Name (full name) [Vaasa]: <-- ENTER
Locality Name (eg, city) [Vaasa]: <-- ENTER
Organization Name (eg, company) [Multitronic Oy]: <-- ENTER
Organizational Unit Name (eg, section) [IT Department]: <-- ENTER
Common Name (eg, YOUR name) []: <-- ENTER
*Email Address [*****@yahoo.fr]:* <-- ENTER
A challenge password []: <-- ENTER
An optional company name []: <-- ENTER

SOME CONFIGURATIONS OF THE MULTI SERVER SETUP: THE MAIL SERVER

- Source: ISPConfig 3 Manual, Version 1.4 (pages 29-33) and <http://www.howtoforge.com/multiserver-setup-with-dedicated-web-email-dns-and-mysql-database-servers-on-debian-squeeze-with-ispconfig-3-p2>

- Configurations done during the generating the SSL Certificate

Country Name (2 letter code) [FI]: <-- "FI").
 State or Province Name (full name) [Vaasa]: <-- Vaasa.
 Locality Name (eg, city) [Vaasa]: <-- Enter your City.
 Organization Name (eg, company) [Multitronic Oy]: <-- MULTitronic Oy
 Organizational Unit Name (eg, section) [IT Department]: <-- Enter your Organizational Unit Name (e.g. "IT Department").
 Common Name (eg, YOUR name) []: <-- Enter the Fully Qualified Domain Name of the system (e.g. "mail.multitronic.fi").
 Email Address [*****@yahoo.fr]: <-- Enter your Email Address.

- Some configurations done during the installation of ISPConfig

Select language (en,de) [en]: <-- en
 Installation mode (standard,expert) [standard]: <-- expert
 Full qualified hostname (FQDN) of the server, eg server1.domain.tld [mail.multitronic.fi]: <-- mail2.multitronic.fi
 MySQL server hostname [localhost]: <-- localhost
 MySQL root username [root]: <-- root
 MySQL root password []: <-- *****
 MySQL database to create [dbispcnfig]: <-- dbispcnfig
 MySQL charset [utf8]: <-- utf8
 Shall this server join an existing ISPConfig multiserver setup (y,n) [n]: <-- y
 MySQL master server hostname []: <-- web010.multitronic.fi
 MySQL master server root username [root]: <-- root
 MySQL master server root password []: <-- *****
 MySQL master server database name [dbispcnfig]: <-- dbispcnfig
 Configure Mail (y,n) [y]: <-- y
 Country Name (2 letter code) [FI]: <-- (Enter the ISO country code where you live here)
 State or Province Name (full name) [Vaasa]: Locality Name (eg, city) [Vaasa]: <-- (Enter the city here)
 Organization Name (eg, company) [Multitronic Oy]: <-- ENTER
 Organizational Unit Name (eg, section) [IT Department]: <-- ENTER
 Common Name (eg, YOUR name) []: <-- ENTER
 Email Address [*****@yahoo.fr]: <-- ENTER

Configure Jailkit (y,n) [y]: <-- n
Configure FTP Server (y,n) [y]: <-- n
Configure DNS Server (y,n) [y]: <-- n
Configure Apache Server (y,n) [y]: <-- n
Configure Firewall Server (y,n) [y]: <--y
Install ISPConfig Web-Interface (y,n) [y]: <--n

SOME CONFIGURATIONS OF THE MULTI SERVER SETUP: THE DATABASE SERVER

- Source: ISPConfig 3 Manual, Version 1.4 (pages 29-33) and <http://www.howtoforge.com/multiserver-setup-with-dedicated-web-email-dns-and-mysql-database-servers-on-debian-squeeze-with-ispconfig-3-p3>

- Some configurations done during the installation of ISPConfig

```
Select language (en,de) [en]: <-- en
Installation mode (standard,expert) [standard]: <-- expert
Full qualified hostname (FQDN) of the server, eg server1.domain.tld
[db2.multitronic.fi]: <-- db2.multitronic.fi
MySQL server hostname [localhost]: <-- localhost
MySQL root username [root]: <-- root
MySQL root password []: <-- *****
MySQL database to create [dbispconfig]: <-- dbispconfig
MySQL charset [utf8]: <-- utf8
Shall this server join an existing ISPConfig multiserver setup (y,n) [n]: <-- y
MySQL master server hostname []: <-- web010.multitronic.fi
MySQL master server root username [root]: <-- root
MySQL master server root password []: <-- *****
MySQL master server database name [dbispconfig]: <-- dbispconfig
Configure Mail (y,n) [y]: <-- n
Configure Jailkit (y,n) [y]: <-- n
Configure FTP Server (y,n) [y]: <-- n
Configure DNS Server (y,n) [y]: <-- n
Configure Apache Server (y,n) [y]: <-- n
Configure Firewall Server (y,n) [y]: <--y
Install ISPConfig Web-Interface (y,n) [y]: <--n
```

SOME CONFIGURATIONS OF THE MULTI SERVER SETUP: THE DNS SERVERS

- Source: ISPConfig 3 Manual, Version 1.4 (pages 29-33) and <http://www.howtoforge.com/multiserver-setup-with-dedicated-web-email-dns-and-mysql-database-servers-on-debian-squeeze-with-ispconfig-3-p4>

- Some configurations done during the installation of ISPConfig

```

Select language (en,de) [en]: <-- en
Installation mode (standard,expert) [standard]: <-- expert
Full qualified hostname (FQDN) of the server, eg server2.domain.tld
[ns1.multitronic.fi]: <-- ns3.multitronic.fi
MySQL server hostname [localhost]: <-- localhost
MySQL root username [root]: <-- root
MySQL root password []: <-- *****
MySQL database to create [dbispcnfig]: <-- dbispcnfig
MySQL charset [utf8]: <-- utf8
Shall this server join an existing ISPConfig multiserver setup (y,n) [n]: <-- y
MySQL master server hostname []: <-- web010.multitronic.fi
MySQL master server root username [root]: <-- root
MySQL master server root password []: <-- *****
MySQL master server database name [dbispcnfig]: <-- dbispcnfig
Configure Mail (y,n) [y]: <-- n
Configure Jailkit (y,n) [y]: <-- n
Configure FTP Server (y,n) [y]: <-- n
Configure DNS Server (y,n) [y]: <-- y
Configure Apache Server (y,n) [y]: <-- n
Configure Firewall Server (y,n) [y]: <--y
Install ISPConfig Web-Interface (y,n) [y]: <--n

```

ISPCONFIG REMOTE API SCRIPTS: MIGRATE.PHP

```
<?php

require_once "DB.php";
require_once "soap_config.php";

function chkdb($result)
{
    if (DB::isError($result)) die("Database Error: " . $result->getDebugInfo());
}

function createusername($customer)
{
    $str = "";
    if (!empty($customer['icustomer_company'])) {
        $str = strtolower($customer['icustomer_company']);
    } else $str = strtolower($customer['icustomer_name']);
    $str2 = "";
    for($i=0;$i<strlen($str);$i++) {
        if ($str[$i] >= 'a' and $str[$i] <= 'z') $str2 .= $str[$i];
    }

    return $str2;
}

function createrandompassword()
{
    $len = 10; $incLetters = true;

    $exclude = array('I', 'l', '1', 'O', '0');
    $rtext = "";
    for ($i = 0; $i < $len; $i++) {
        do {
            $char = chr(rand(48, $incLetters ? 122 : 57));
        } while ( preg_match('/[a-zA-Z0-9]/', $char) !== 1
            or (isset($lastchar) and $char == $lastchar)
            or ($incLetters and in_array($char, $exclude)));
        $rtext .= $lastchar = $char;
    }
    return $rtext;
}

$sourcedsn = "pgsql://userid:password@server/database"; // DSN to old customer
database

$db = DB::connect($sourcedsn);
```

```
$db->setFetchMode(DB_FETCHMODE_ASSOC);

chkdb($customers = $db->getAssoc("SELECT * FROM customers.internetcustomer ORDER BY icustomer_id"));

$client = new SoapClient(null, array('location' => $soap_location,
    'uri' => $soap_uri,
    'trace' => 1,
    'exceptions' => 1));

try {
    $session_id = $client->login($username,$password);

    foreach ($customers as $customer_id => $customer_data)
    {
        if (in_array($customer_id, array(1,2))) continue;

        $username = createusername($customer_data);

        $temp_record = $client->client_get_by_username($session_id, $username);

        if ($temp_record === FALSE) {
            /* Set the function parameters.
            $random_rs_id = 1;
            $params = array(
                'company_name' => $customer_data['icustomer_company'],
                'contact_name' => $customer_data['icustomer_name'],
                'customer_no' => $customer_id,
                'vat_id' => '1',
                'street' => $customer_data['icustomer_address'],
                'zip' => $customer_data['icustomer_zip'],
                'city' => $customer_data['icustomer_city'],
                'state' => "",
                'country' => $customer_data['icustomer_countryid'],
                'telephone' => $customer_data['icustomer_phone'],
                'mobile' => "",
                'fax' => $customer_data['icustomer_fax'],
                'email' => $customer_data['icustomer_email'],
                'internet' => "",
                'icq' => "",
                'notes' => $customer_data['icustomer_comment'],
                'default_mailserver' => 1,
                'limit_maildomain' => -1,
                'limit_mailbox' => -1,
                'limit_mailalias' => -1,
                'limit_mailaliasdomain' => -1,
                'limit_mailforward' => -1,
                'limit_mailcatchall' => -1,
```

```

        'limit_mailrouting' => 0,
        'limit_mailfilter' => -1,
        'limit_fetchmail' => -1,
        'limit_mailquota' => -1,
        'limit_spamfilter_wblist' => 0,
        'limit_spamfilter_user' => 0,
        'limit_spamfilter_policy' => 1,
        'default_webserver' => 1,
        'limit_web_ip' => "",
        'limit_web_domain' => -1,
        'limit_web_quota' => -1,
        'web_php_options' => 'no,fast-cgi,cgi,mod,suphp',
        'limit_web_subdomain' => -1,
        'limit_web_aliasdomain' => -1,
        'limit_ftp_user' => -1,
        'limit_shell_user' => 0,
        'ssh_chroot' => 'no,jailkit,ssh-chroot',
        'limit_webdav_user' => 0,
        'default_dnsserver' => 1,
        'limit_dns_zone' => -1,
        'limit_dns_slave_zone' => -1,
        'limit_dns_record' => -1,
        'default_dbserver' => 1,
        'limit_database' => -1,
        'limit_cron' => 0,
        'limit_cron_type' => 'url',
        'limit_cron_frequency' => 5,
        'limit_traffic_quota' => -1,
        'limit_client' => 0,
        'parent_client_id' => 0,
        'username' => createusername($customer_data),
        'password' => createrandompassword(),
        'language' => $customer_data['icustomer_language'],
        'usertheme' => 'default',
        'template_master' => 0,
        'template_additional' => "",
        'created_at' => 0
    );
    $affected_rows = $client->client_add($session_id, $random_rs_id,
$params);
    }
}

if($client->logout($session_id)) {
    echo 'Logged out.<br />';
}

```

```
} catch (SoapFault $e) {  
    echo $client->__getLastResponse();  
    die('SOAP Error: '.$e->getMessage());  
}  
  
?>
```