UNIVERSITY OF VAASA
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PREDICTING THE OTT SERVICES CAPACITY BASED ON NETWORK TRAFFIC ANALYSIS

Master's thesis for the degree of Master of Science in Technology submitted for Inspection, in Vaasa, 7th November 2015.

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Lina Maria Fernandez Gualdron

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ABBREVIATIONS

ADSL	Asymmetric Digital Subscriber Line
API	Application Programming Interface
B2B	Business to Business
BI	Business Intelligence
CMTs	Cable Modem Termination System
CLI	Command Line Interface
CPS	Connections per Second
CRM	Customer Relationship Management
CSV	Comma Separated Values
DARPA	Defense Advanced Research Projects Agency
DES	Double Exponential Smoothing
DDoS	Distributed Denial of Service
DPI	Deep Packet Inspection
DRDL	DataStream Recognition Definition Language
ESS-7	Ethernet Service Switch 7450
GE	Gigabit Ethernet
ICT	Information and Communications Technology
IOS	Internet Operating System
IP	Internet Protocol
IPTV	Internet Protocol Television
MA	Moving Average
OTT	Over The Top
PL	PacketLogic
PLD	PacketLogic Database
QA	Quality Assurance
QoE	Quality of Experience
RMSE	Root Mean Square Error

RU	Rack Unit
SES	Simple Exponential Smoothing
SNMP	Simple Network Management Protocol
SR-7	Service router 7750
SSH	Secure Shell
TCP	Transmission Control Protocol
VoIP	Voice over Internet Protocol
WAN	Wide Area Network
WiFi	Wireless Fidelity
WLAN	Wireless Local Area Network
YLE	Oy Yleisradio

SYMBOLS

n	Number of data point selected to calculate average
$\mathbf{PM_t}$	It is the moving average in period ***t***
$\mathbf{X_{t+1}}$	It is the forecast value for the next period
$\mathbf{X_t}$	It is the real value observed in the period ***t***
$\boldsymbol{\alpha}$	Smoothing constant ($0< \boldsymbol{\alpha}$ 1)
$\widehat{\boldsymbol{X}}_t$	Average of bytes in a period t
$\widehat{\boldsymbol{X}}_{\boldsymbol{t-1}}$	Forecast of bytes in a period t-1
$\boldsymbol{X_{t-1}}$	Bytes in real time in a period t-1
$\boldsymbol{S_T}$	Simple exponential smoothing value at the end of period T
$\boldsymbol{B_T}$	Double exponential smoothing value at the end of period T
$\boldsymbol{\beta}$	Constant for trend setting
$\boldsymbol{k}$	Determines the number of forecasts
$\boldsymbol{F_{T+k}}$	Forecast in period T+k
F	Number of periods to Forecast

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ABSTRACT:

As part of the response to new society behavior patterns and technological advances that are occurring in our environment, OTT (Over the Top) services have appeared on the market, and they have high acceptance to be mentioned and to be analyzed.
Telecom operators see how OTT solutions are replacing their traditional services. Furthermore, these services do not generate personal income rate (beyond access to the internet) that can compensate operator's market loss.

Anvia Oyj, a Telecom Finnish company, is also interested in knowing how OTT services are affecting its market and how much traffic these services generate in its network.

This thesis work studied the current OTT services at Anvia Oyj; data was collected for several months and analyzed it, using a tool that was created during this thesis work and as a result, it shows the prediction about how OTT services will grow at Anvia during the next couple of months.

KEYWORDS: Over The Top services, Quality of Experience, Predicting, PacketLogic Device, Forecasting methods, Data organization.

1. INTRODUCTION

OTT, Over-The-Top is a term to designate services that use wide area networks, and traditional telecommunications companies do not offer those services. It is called over the top because they do not require membership to telephone networks operators.

Currently, Over the Top services are presently in most of the everyday communication activities and entertainment consumption. Many human behaviors have been modified because of the emergence of these services and many technological advances have arisen that allow keeping changing communications patterns, also to be communicated at anytime, anywhere.

OTT services and their associated business models are causing that traditional sectors, such telecommunications operators, feel affected their operations in one of the most worrying areas: economic benefits.
The telecommunications companies are challenged to participate harder in OTT services. Some of them have established specialized units of digital services, recognizing the need for rapid and collaborative methods, which is a deflection from their structured approach that has characterized the telecommunications industry.

Broadband, both fixed and mobile and the continuous growing of users with high-capacity devices including smartphones and tablets under IOS and Android systems or laptops, netbooks and ultra-books have changed the patterns of video consumption dramatically in current years.
As a result, future mobile and fixed wireless networks will be optimized to guarantee the provision of a video content collection.

The high demand for multimedia traffic will increase, and this order requires the exploration of new techniques to improve future networks with greater capacity to deliver video services to serve more users with better Quality of Experience (QoE).
An improvement in these video solutions is the use of HTTP adaptive streaming, which is a technique of delivering video and it has been deployed more broadly. As a relatively new technology compared to traditional adaptive streaming techniques based on pushing the deployment of HTTP adaptive streaming presents new challenges and opportunities for content developers, service providers, network operators and device manufacturers.

This paper presents an analysis of services and video technologies OTT Over the Top in Anvia's network, using a powerful device***: PacketLogic PL8720*** which will capture the traffic, and subsequently classify it based on rules, favoring the identification of OTT services.
A study of the state of the art will be prepared as well as a description of previous traffic devices implemented at Anvia, previous measurements, results obtained company business model and the target customers.

The purpose of this Project is to analyze the data from OTT services at Anvia's network, evaluate their strengths and weaknesses, defining quality parameters, estimate their growth in the company's network and finally propose projections about over the top services behavior for the next months.

2. STATE OF ART

Anvia has been using different tools to monitor its own network, but the data collected from the different observations were never used for analysis or further studies. Nevertheless, it is important to mention in this document, the devices and tools Anvia has been using to observe its network.

2.1. Previous Measurements implemented

2.1.1. Arbor system

It is a worldwide leader in network security. Arbor is the result of innovative research accomplished by the University of Michigan. Its researchers were funded by the Defense Advanced Research Projects Agency (DARPA) of the US Department of Defense. In 2000, it began its operations as Arbor Networks. Since then, Arbor has been dedicated to research, identify and mitigate web-based threats. The firm is best known for its extensive deployment in the operators' community. Arbor technology is present in 70% of network operators worldwide, including 95% of the operator's level 1. Arbor technology is also widely implemented in the leading providers of hosting and cloud services (ArborNetworks).

Arbor detects attacks in networks, especially DDOS (Denial of Service attack) which is an attempt by an attacker to consume the resources available to a network, application or service so that real users can not have access to the network.
DDoS attacks vary widely, and there are many different forms of executing an attack (attack vectors) but usually these attack vectors belong in one of the three broad categories:

- "Volumetric attacks: Attempt to consume bandwidth either in-network/target service or between the network/service stations and the rest of the Internet. These attacks usually just cause blockages". (Arbor, 2014)

- “TCP state Exhaustion attacks: These attacks attempt to consume the condition of the connection tables that are currently in many of the infrastructure components such as load balancers, firewalls and application servers themselves”. (Arbor, 2014)
- “Application-layer attacks: The targets of these attacks are applications or services on the layer-7. They are a fatal type of attacks, as they can be very effective attacking only one machine generating a low rate of traffic (that makes these attacks are tough to detect and mitigate proactively)”. (Arbor, 2014)

2.1.2. NetAdmin

NETADMIN plays an operational management on the architecture of heterogeneous network, composed of edge or old technologies, and different solutions. This flexibility allows them to cooperate with the operators using the old infrastructure via coaxial cable.
By implementing NETADMIN as a single cover operational tool, it simplifies the unification of CRM to all services and network elements and at the same time facilitates the creation and the direct management of multiple services.
Next Generation Networks usually involves new chains values, which require cooperation between the active operators in different layers. Such complexity Partnership scenarios require in turn an efficient control and the effective way to share data. NETADMIN provides this control.
NETADMIN platform is very flexible and open; it facilitates the adaptation of modules to integrate existing systems, fulfilling an essential requirement for the needs and plans of an operator. (NetAdminSystems)

2.1.3. Agama

It is a skillful firm in telco-grade video quality assurance (QA) and scanning solutions. Agama allows IP, cable, broadcast and OTT TV operators to accomplish methodically

service quality and increase client fulfilment although at the same time decreasing operational costs and quality-induced churn. These skills include supporting telecom companies in achievement control and comprehension of the service distribution through their deployments, building a sturdy foundation for guaranteeing the customers' TV experience and for completing operational distinction in the video distribution. (AgamaTechnologies).

3. ANVIA BUSINESS MODEL

Anvia is a group in expansion of products and services in information, communication and security technology and the fourth largest telecommunications operator in Finland. Anvia offers to consumers and businesses cutting-edge quality solutions in communications, IT administration, and safety.

Anvia knows its customer and the customer feels Anvia. Through its services Anvia exists in the client's living every day and works as a partner for the best of its customers. (AnviaOyj, 2015)

3.1. Services Anvia Offers

Anvia Business to Business services, B2B are:

- Broadband
- Television Services
- Voice Traffic, VoIP
- Home Energy Management
- Equipment Sales
- Data Connections and Internet Services
- Communication Solutions
- Hosting and Cloud Services
- ICT Infrastructure
- CRM, BI, and collaboration solutions
- Security Technology and Services
- Systems for Digital Transmission of Video- and Audio Signals
- Consulting (AnviaOyj, 2015)

3.1.1. Broadband

Anvia Broadband offers a trusted and reliable functioning of the internet in customers home. Whether customers live, in isolated houses, townhouses or high-rise buildings, Anvia can offer an excellent internet connection. Customers can expand connectivity to a wireless network covering the entire home.

Anvia offers two broadband packages:

- *Anvia Broadband Tuhti* which has 3 sizes: S is 50 Mbit/s, M is 100 Mbit/s and L is 250 Mbit/s.
- *Anvia Basic Broadband* which has 3 sizes S is 5Mbit/s, M is 10Mbit/s and L is 24Mbit/s. (AnviaOyj, 2015)

3.1.2. Television Services

- Cable television has good image quality and customers don't need to get up on the roof and set up the cable according to the wind direction, they can watch many channels that are not visible in the antenna network. Anvia offers a range of over 70 TV channels and 20 radio channels and the range widens all the time. Customers can order packages of channels at any time at home via the Internet or telephone. (AnviaOyj, 2015)
- WATSON is a TV service offered by Anvia where the customers can watch TV and order pay-tv channels at their convenience; they can watch TV programs from the basic channels in live or after the event and in addition, store unlimited applications in half a year. Customers have a huge software library at their disposal and watch their favorite programs whenever they want. (AnviaOyj, 2015)

  Watson works via the WLAN network to all devices at home: TV, computer, tablet and smart phones. Customer can start looking in one device and continue in another.
- Anvia Fiber connection is the most modern and efficient data connection customer can get to their home. The new generation of fiber connectivity enabling TV picture top

quality, almost unlimited speed and new services to their broadband in the future - all telecom services will come to their home via a single connection. (AnviaOyj, 2015)

3.2. Geographic service distribution

October 1882 was an exciting time in Vaasa: for the first time, the townspeople spoke among themselves by phone. For over 130 years ago it was the Wasa Telephone Association among the first in Finland to offer the brand new phone technology to the business sector and residents' needs and the same idea still lives on: Anvia follows with their time and always allows the best services for its customers.

Broadband, Television services, Data Connections and Internet Services are offered in the area of Vaasa, Kokkola and Seinäjoki. In other places of Finland are provided services like Consulting, CRM, BI and Collaboration, Hosting and Cloud Services. (AnviaOyj, 2015)

Figure 1. Business in Finland. (Anvia, 2014)

4. ANVIA'S NETWORK TOPOLOGY

There are two scenarios taken into consideration for measurement at Anvia. The first scenario was Seinäjoki with certain amount of active IP addresses and the second was Vaasa with a large audience active IP addresses. They have broadband and television service and their connections are cable modem connections.

Anvia started its network measurement with PL Procera device on March 2015. Passive monitoring was the technique used to store data for 6 weeks while the device was installed in Seinäjoki.

This Technique had the advantage that it did not interfere with normal operation of the network since the device "PacketLogic" was configured in such a way that it created a copy of the current network, this is called mirroring.

In Vaasa, the mirroring traffic came from the CMTS and traffic was mirrored from one of the core routers. The total bandwidth implemented in the mirroring service was 10GB. The egress traffic and the ingress traffic through the devices ports were mirrored.

The next figure explains Procera deployment in Seinäjoki.

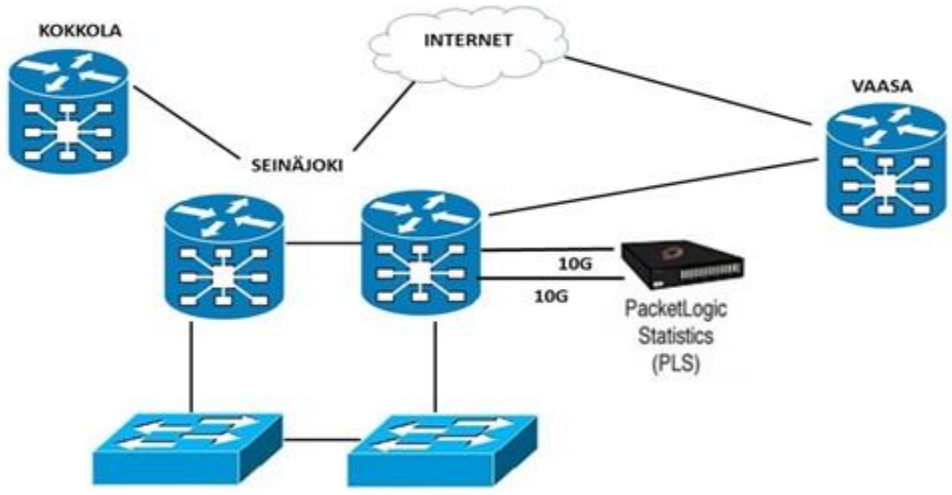

Figure 2. PacketLogic PL8720 deployment at Anvia in Seinäjoki.

Procera was moved from Seinäjoki to Vaasa on May 25th and the mirroring service was set up on May 28th.

There are some changes in the deployment of the device in Vaasa and the next picture gives an overview of the network and the location of PL.

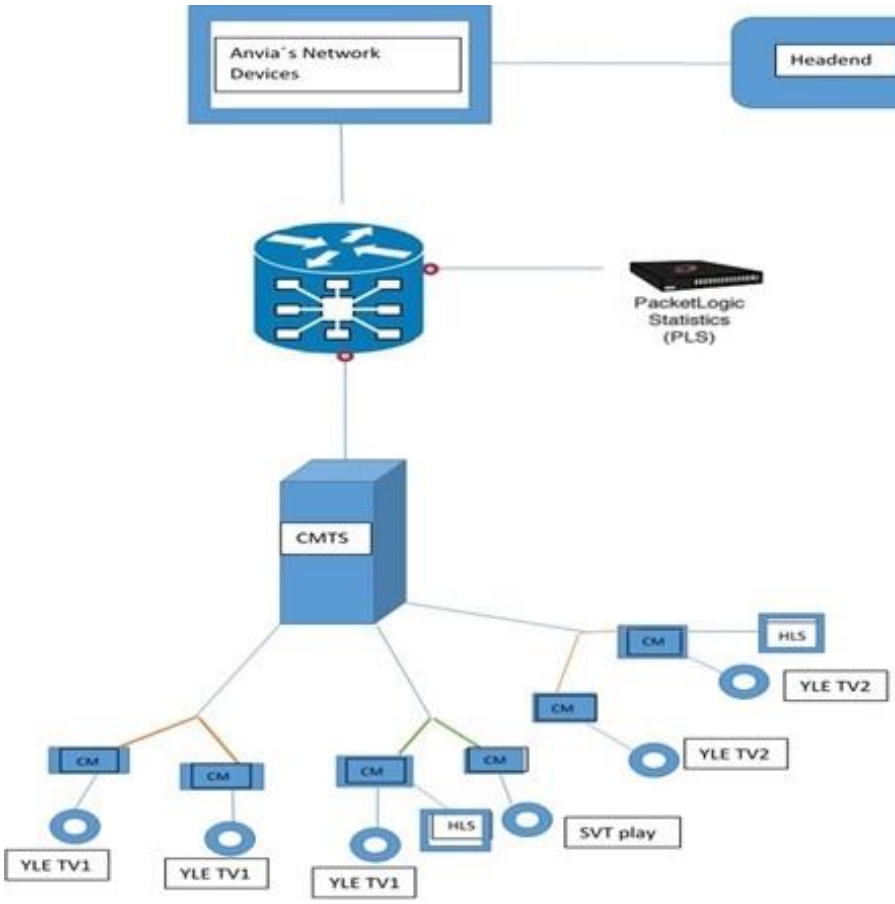

Figure 3. PacketLogic PL8720 deployment at Anvia in Vaasa.

5. OTT BUSINESS

Over The Top solutions are presented as services that using the networks of telecom operators deploy over the Internet products or services offered directly to users.

The growth of OTT services in the market highlights one of the most critical points of the OTT business model: the lack of direct revenue that affects operators. (Green & Lancaster, 2006)

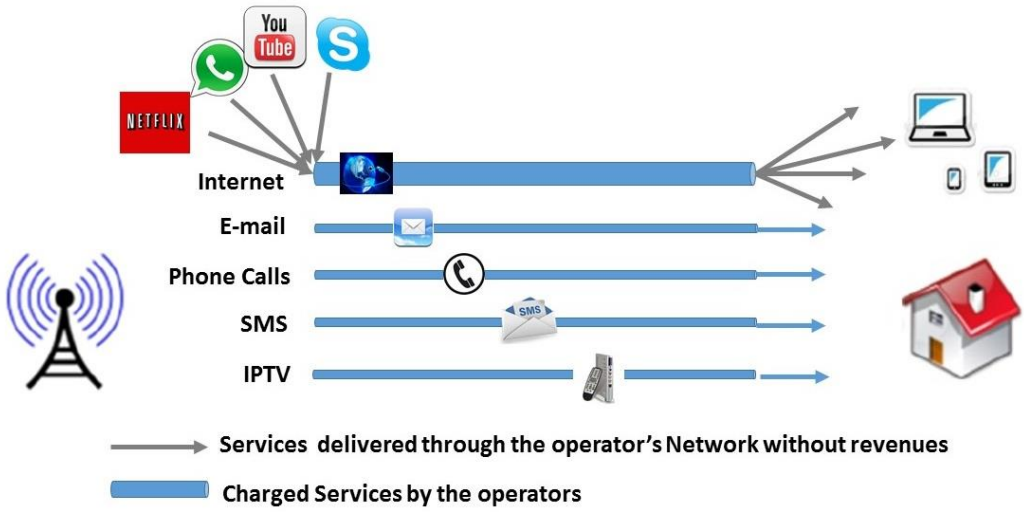

Figure 4. Traditional operator services and OTT services.

The main OTT applications that currently have a big impact on the traditional services offered by operators are voice, messaging, music and video, although there are other OTT's with social impact in the field of photography and games increasing rapidly.

Voice could possibly be one of the first OTT services to develop and consolidate in the market, its main contribution was the possibility of establish "no cost" phone calls using the data network. It is necessary to have the same application on the receiver and both be connected to the Internet. Applications like Skype, Viber and Tango are leaders in this market by offering extra content such as video calls or telepresence. (Bhawan & Marg, 2015)

Another traditional service most impacted by OTT is messaging; this service generates greater benefit for operators due to the low cost. In recent years, these services are being replaced by applications like WhatsApp or Line which growth has exceeded all expectations and forecasts.

There are currently two types of OTT solutions that support the music market in the network: buying content online and streaming online where two services are leaders, iTunes and Spotify respectively.

But if there is an industry whose business models are being consolidated and exploding in recent years, and indicates attractive future prospects, is the video. Sharing video clips and the streaming consumption of shows and movies it is part of the routine of most users and it is one of the main portions of the traffic in the operators data network. In the following image the main applications are plotted. (Lopez, 2014)

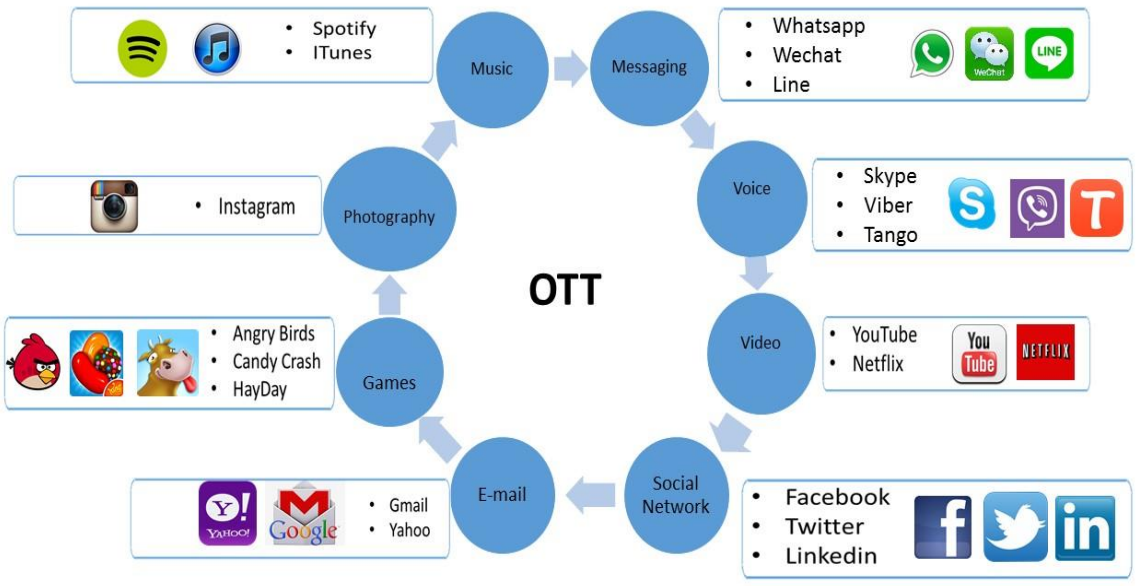

Figure 5. Most popular OTT services in the market.

6. ARCHITECTURE OF PROCERA DEVICE: PACKETLOGIC PL8720

6.1. Hardware

> *PL8720 is an joined two (2) rack unit (RU) 19" rack-mounted device that supports configurations up to 8 channels of Gigabit Ethernet (GE) as well as four channels of 10 Gigabit Ethernet; this makes the PL8720 Two interfaces are bonded as a channel with an Internal and an External interface. These interfaces can be any kind of Gigabit Ethernet (GE) – RJ-45 copper or single mode (LX)/multimode (SX) fiber or fiber Ten Gigabit Ethernet (10GE) .Interfaces are deployed as physical channel modules. The Layer 2 design assigns no IP addresses to these interfaces, which substantially increases security by disabling targeted attacks. It also gives minimum network impact, low latency, easy deployment and increased capacity* (PacketLogicNetworks, 2012:1).

Figure 6. PacketLogic PL8720. (PacketLogicNetworks, 2012:1)

PL8720 is projected for placement at the broadband access/edge or WAN connection of networks. It can be passively connected for monitor-only intent, while allowing control activities like filtering and bandwidth controlling involves in-line deployment. This is due to PacketLogic strong architecture that makes DPI non-disruptive and cleverer.

The device can be applied to any activity that requires following the traffic flow in a network such as protecting the network from harmful traffic. (PacketLogicNetworks, 2012)

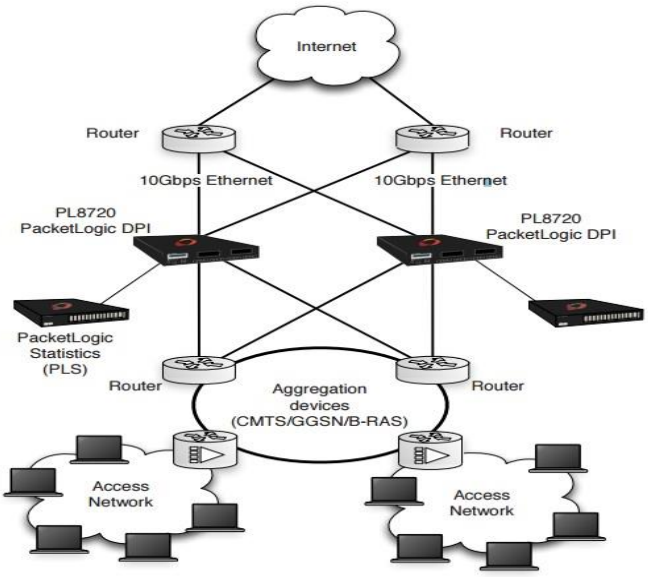

Figure 7. Typical deployment PacketLogic PL8720. (PacketLogicNetworks, 2012:2)

Specifications	
Hardware	
Hardware	• 2 rack unit (RU), 19" rack-mounted
Physical Dimensions (not including handles and cable holders)	• 3.5" (h) x 16.7" (w) x 23" (d) / 8.0 cm (h) x 43.0 cm (w) x 54.7 cm (d)
Power	• 100-240 VAC or 36-72 VDC • Redundant, 2 x 600W, load sharing, hot swap, dual line cords
Weight	• 40 lbs/18 kg
Channels	• Four (4) GE ports (Two channels) with Internal and External interfaces • Two (2) 10GE ports (One 10 GE channel) with Internal and External interfaces • Up to four (4) modules per system
Interfaces	• RJ-45 BASE-10/100/1000 copper • Multi-Mode SX GE fiber • Single-Mode LX GE fiber • Multi-Mode SR 10GE fiber • Single-Mode LR 10GE fiber
License options	• 1 Gbps • 2 Gbps • 3 Gbps • 4 Gbps • 5 Gbps • Unrestricted bandwidth • On-board Statistics and WebStatistics available for up to 1,000 local hosts

Figure 8. Hardware Specifications PL8720. (PacketLogicNetworks, 2012:3)

Capacity and Performance (under normal conditions)	
Bandwidth	• Up to 10 Gbps throughput
Concurrent Flows	• 4 million
New Connections per Second (CPS)	• 150,000
Subscribers	• Up to 500,000 subscribers
Integration & Management	
Interfaces	• Graphical User Interface (GUI) administration client for Windows, Linux and MacOSX • Python Application Programming Interface (API) for Windows, Linux and Solaris • SNMPv2 • Syslog • Command Line Interface (CLI)
Physical Interfaces	• RJ-45 BASE-10/100/1000 Admin interface • RJ-45 BASE-10/100/1000 AUX interface • RJ-45 Serial Console interface • All systems management interfaces are front-mounted
Miscellaneous	
Modules	• LiveView – real-time traffic view • Statistics – traffic analyzing • Filtering – Layer 7 filtering and network protection • Traffic Shaping – bandwidth management • WebStatistics – web interface connecting into *Statistics* (above)
DRDL Signatures	• ~1,600 signatures (January 2010)
Subscriber Authentication	Dynamic creation of per user NetObjects and assignment of current IP address through: • DHCP Snooping • Radius Snooping • Python API integration (w/ DHCP, AAA, LDAP, AD etc.)

Figure 9. PL8720 specifications. (PacketLogicNetworks, 2012:3)

6.2. DataStream Recognition Definition Language DRDL

> *DRDL is a payload analyzer called by the network stack in PacketLogic. DRDL looks at every byte of each connection until the connection is matched to a signature and classified (or classified as Unknown). DRDL operates a signature database, which is compiled by a DRDL compiler into binary form. This binary module is then loaded into the network stack, where the DRDL glue uses it to analyze packets*. (PacketLogicNetworks, 2012:19).

The CPU management of DRDL is separate of the number of protocols in the signature database. The additional capacity that DRDL locates on the system very much depends on the traffic category, particularly the number of new sessions per second, and the type of protocols used.

6.3. PacketLogic Software interface

6.3.1. User interface

PacketLogic PL8720 has 4 user interfaces: the API, the console, SNMP, the client.

- *The API:* this part is in charge of the automation of functions and aggregation with additional network nodes; it is accessible as a Python unit.
- *The console:* It is used to do basic configuration functions when setting up the device. Two ways are provided to access the console, through a locally port or a SSH connection.
- *SNMP:* the device supports connections through the Simple Network Management Protocol.
- *The client:* It is the graphical interface to configure and operate the device, where features like monitoring (in the LiveView views), displaying statistics (in the Statistics views), configuring the ruleset (in the Objects and Rules editor) are executed. The client uses menus, buttons, and tabs for fast guiding. (PacketLogicNetworks, 2012:87)

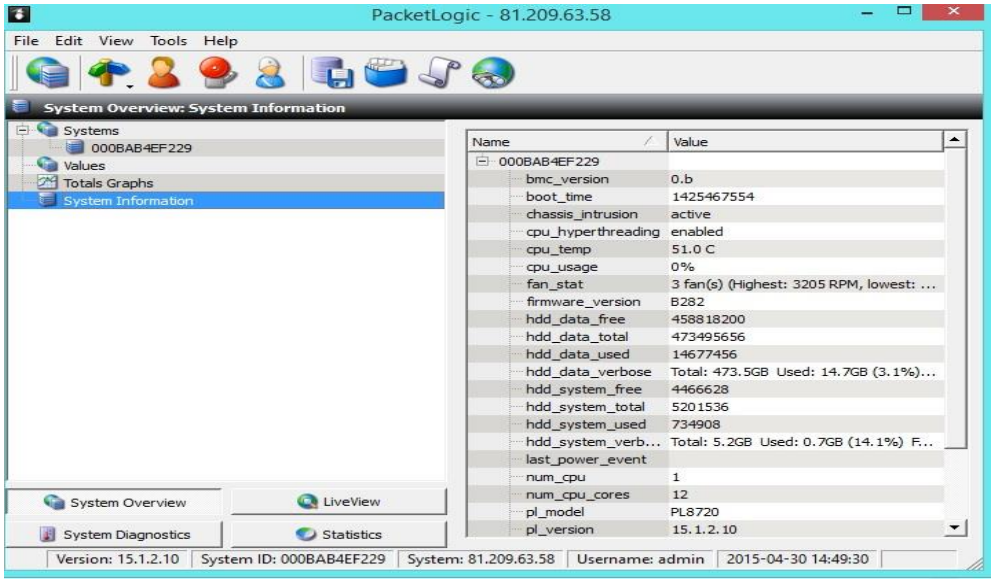

Figure 10. PacketLogic Client at Anvia

6.3.2. PacketLogic database daemon

The PacketLogic Database daemon handles the following tasks:

- Communication with the different clients.
- Communication with and management of the local database holding the ruleset and configuration.
- Communication with remote database servers (Proxy).
- Session and resource management (transaction based).
- Data queries (retrieval and modification).
- Reading and writing statistical data. (PacketLogicNetworks, 2012:35)

A connection data from the PLD is send to the PacketLogic Statistics Daemon, this connection sends information about the traffic that has been delimited in the statistics rules, based on the StatisticsObject. This process is repetitive so information can be stored in the Statistics View. (PacketLogicNetworks, 2012:35).

6.3.3. Traffic Identification

The device has great ability to identify traffic in detail. To achieve this identification is necessary to meet the following criteria:

- *Host and network IP addresses: These criteria are defined in NetObjects, as individual IP addresses, address ranges, or entire IP subnets.*
- *Layer 4 Port numbers: These criteria are defined in PortObjects, as individual port numbers or ranges of ports.* (PacketLogicNetworks, 2012:23)

6.3.4. PacketLogic Traffic shaping

PL Traffic Shaping is an additional component for PacketLogic and allows modeling the traffic going through the network. Traffic shaping, briefly, signifies that specific categories of traffic can be ranked according to the importance of the information, also the load of traffic used by different hosts, networks, protocols, and applications can be restricted.

PL shaping tool was designed to be stronger and more flexible which authorize to control large networks with thousands of hosts. Shaping rules and shaping objects cooperate with each other to make the shaping process easily. The figure below describes a network performance without shaping execution. Typically, the bandwidth is exceeded due to big amounts of traffic, at the edge, it remains a queue with all packets that cannot be sent; after certain time the buffer is stuffed and packets are dropped. (PacketLogicNetworks, 2012:37)

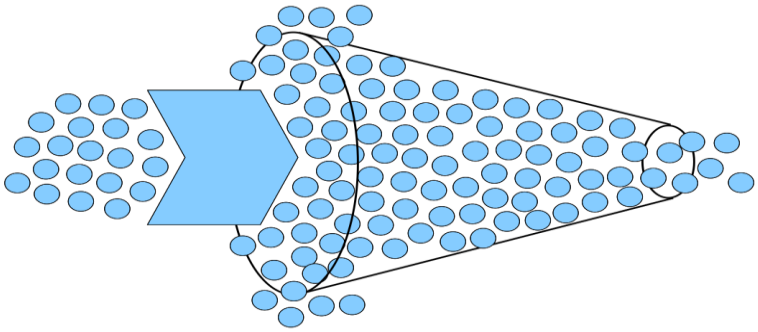

Figure 11. Boundary of an unmanaged network**.** (PacketLogicNetworks, 2012:38)

With the LiveView module the traffic is monitored and identified, prioritizing the packets that consume more bandwidth and the ones that are more important.

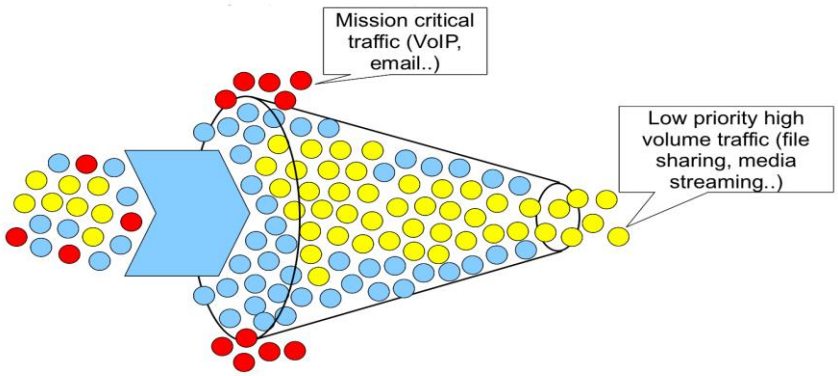

Figure 12. Traffic identified and viewed with the LiveView module.
(PacketLogicNetworks, 2012:38)

PacketLogic creates multiple queues to ease the traffic flow in the network. The number of queues and the type of traffic going through them is configurable by setting a ruleset. The decision of what traffic goes through first in set by the ruleset conditions.

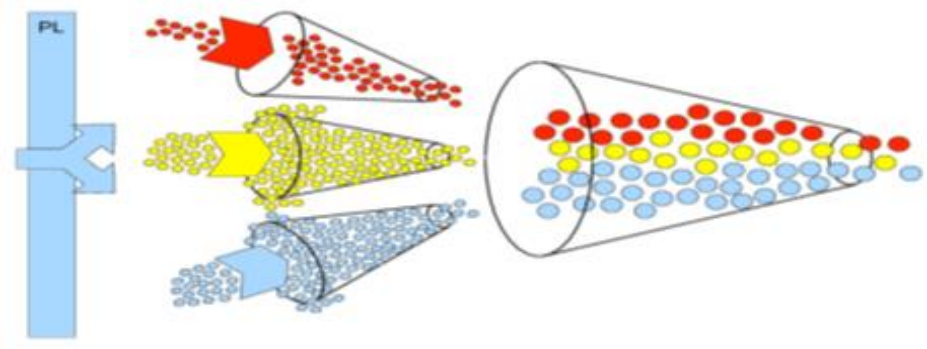

Figure 13. Multiple Queues. (PacketLogicNetworks, 2012:39)

6.3.5. Filtering

Filtering is another module from PacketLogic that uses the same adjustable rule system than PL traffic shaping. PL Filtering manages the potent IP stack of the PL system; in consequence, it has the capability to filter packets and connections centered on information taken by PL. The ruleset has settings that make a lot easier the selection of which traffic the filter is going to contemplate for different arrangements. (See section 6.2 Anvia's rules).

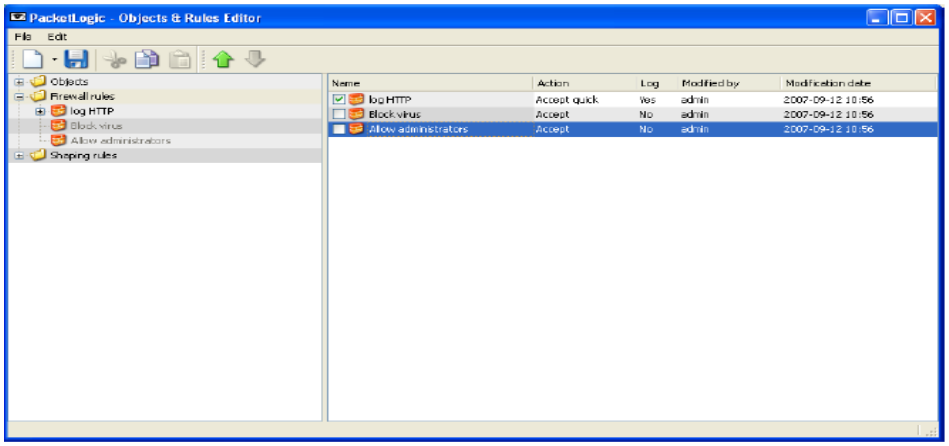

Figure 14. Example of a List of filtering rules. (PacketLogicNetworks, 2012:71)

6.3.6. PacketLogic statistics

PL Statistics is an additional module, accessible through the CLI that allows the administrator to check, analyzed and observe how the network has been used over the time. This module executes the same options as the Liveview with the difference that PL statistics shows the past instead of the present.

Statistics activities are executed through Statistics rules and Statistics Objects. The data is organized, stored and stablished according to the regulations from Statistics objects. Statistics rules are a set of conditions that indicates which traffic will be selected and the information that will be saved in the statistical history storage for further data analysis.

Values are stored every 5 minutes and 24 hours per day.

A value contains numerous fields. Fields can be as total fields and graph fields.

For total values (accumulated), the following fields can be selected: (PacketLogicNetworks, 2012:85)

- Incoming bytes
- Outgoing bytes
- Connections
- Unestablished connections
- Incoming connections
- Outgoing connections
- Incoming unestablished connections
- Outgoing unestablished connections
- Total Bytes
- Incoming concurrent connections (Peak)
- Outgoing concurrent connections (Peak)
- Incoming Dropped Packets
- Outgoing Dropped Packets
- Incoming Avg Latency

- Outgoing Avg Latency
- Sub-Item Count
- Incoming Quality (Internal)
- Outgoing Quality (Internal)
- Incoming Quality (External)
- Outgoing Quality (External)
- Incoming Quality Packets
- Outgoing Quality Packets
- For graph (sample) values, the following fields can be selected:
- Incoming bps
- Outgoing bps
- CPS
- Unestablished CPS
- Incoming CPS
- Outgoing CPS
- Incoming unestablished CPS
- Outgoing unestablished CPS
- Incoming concurrent connections
- Outgoing concurrent connections
- Sub-Item Count
- Total bps
- Incoming Dropped Packets
- Outgoing Dropped Packets
- Incoming Avg Latency
- Outgoing Avg Latency
- Incoming Quality (Internal)
- Outgoing Quality (Internal)
- Incoming Quality (External)
- Outgoing Quality (External)

- Incoming Quality Packets
- Outgoing Quality Packets

(See Anvia's statistics ruleset, section 7.1).

7. DATA ANALISYS

7.1. Anvia´s statistics ruleset

In previous chapter was mentioned the helpfulness of Statistics rules; now the conditions that match the traffic to be stored in the statistics historical data at Anvia: Vaasa Scenario will be described.

Five statistics rules were created, called ***Watson, Yle, Ruutu, Katsomo and OTT_Services*** and the steps to generate them are the same for all five rules therefore YLE stages are taken as example in this document.

- In the CLI, objects and rules tab, an object under the category of NetObject is created, called IP_YLE, which contains the IP address that defines YLE webpage.

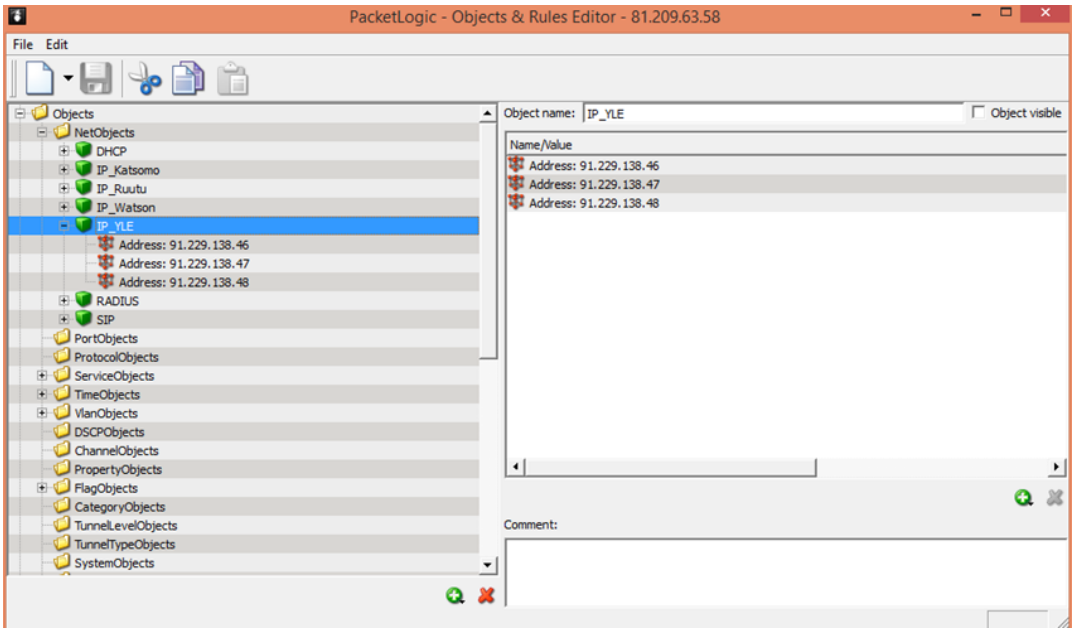

Figure 15. YLE NetObject

- A statistic object called YLE is created and the information to be stored in the data base for this object is selected.

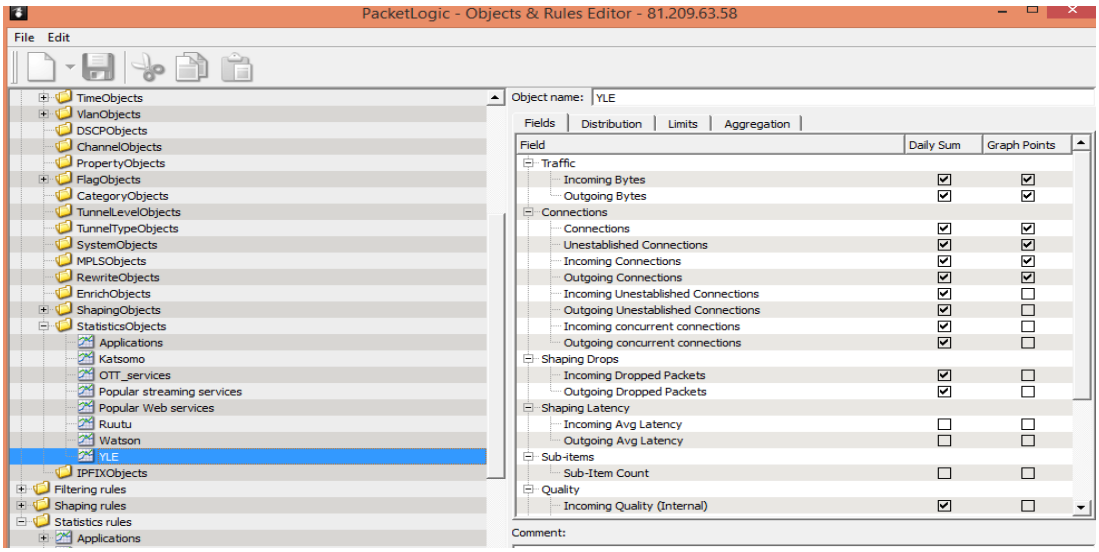

Figure 16. YLE Statistic Object

- A statistic rule is created, named YLE, which contains the objects previously generated.

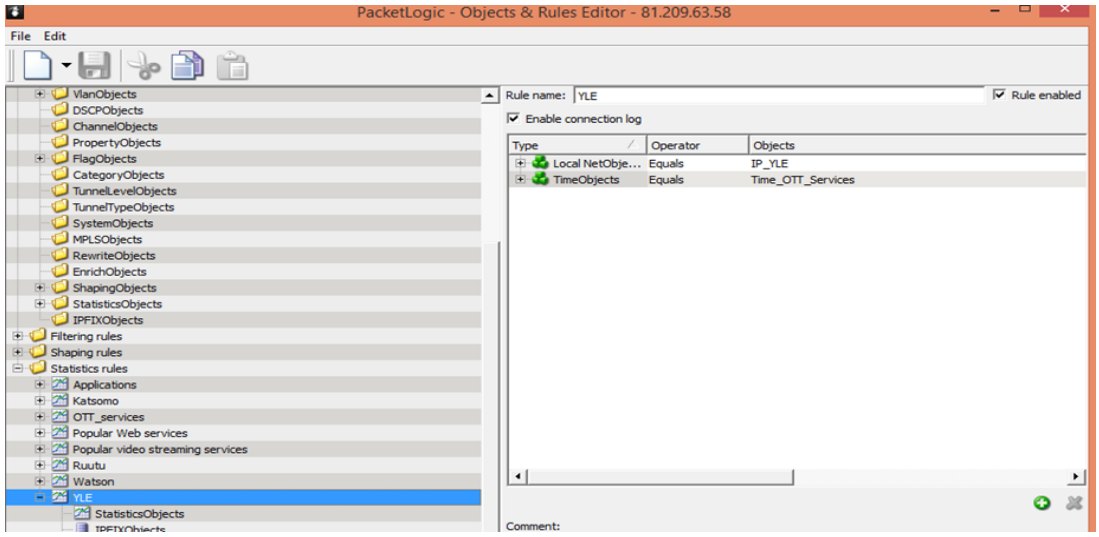

Figure 17. YLE Statistics Rule

In CLI Statistics Objects view it is visible the rules created as it is shown in the next figure

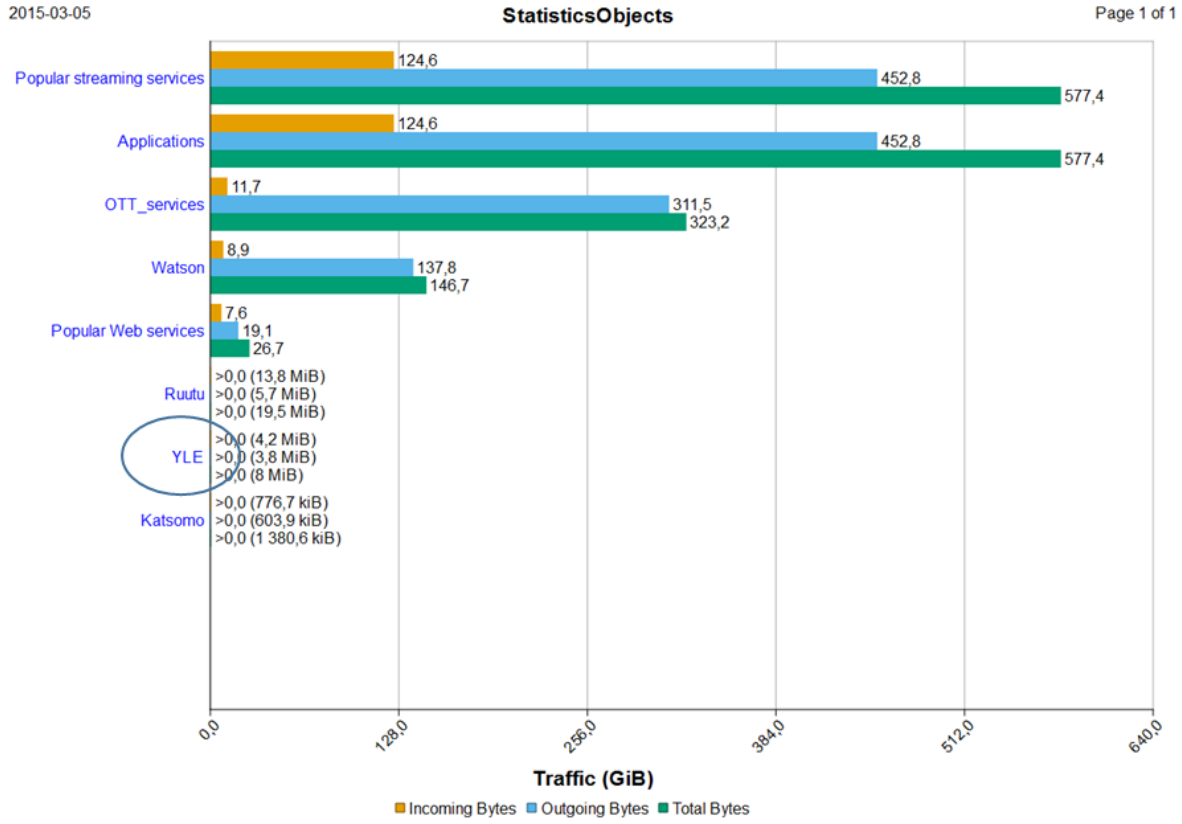

Figure 18. Statistics Objects for Anvia´s Network

7.2. Current Traffic of Services in Anvia

Procera CLI allows capturing figures from the statistics showing the classification and the historical traffic collected during the specified period.

These classifications allow the user to have an overview of which services are the top ones in each category.

Following figures show those categories and its traffic.

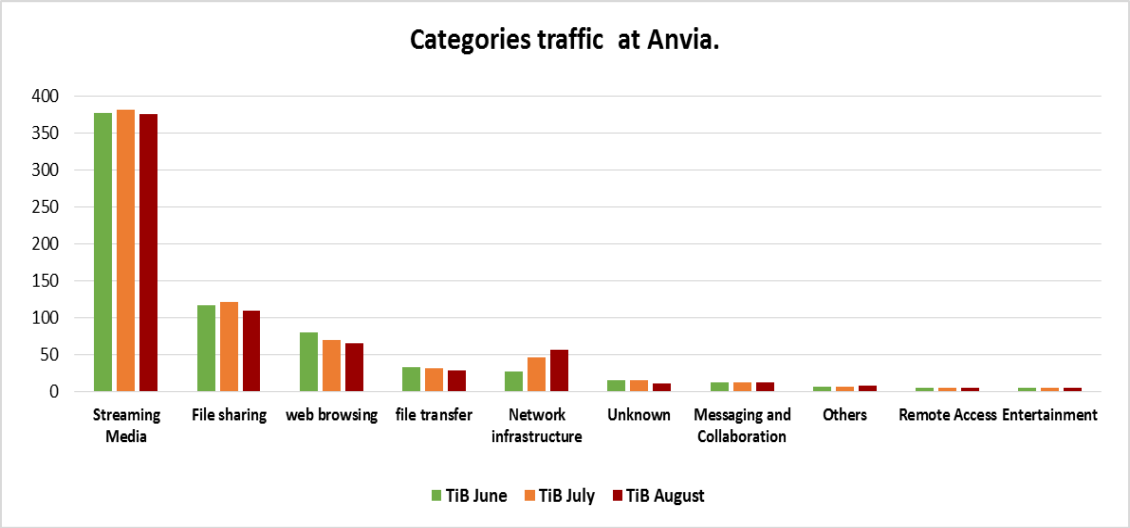

Figure 19. Current Categories at Anvia

Services that belong to the same category are stored inside their respectively folder, for example Netflix and YouTube belong to Streaming Media category and Facebook and Twitter belong to web Browsing category.

It is important to highlight that the portion "Others" is actually the smallest categories, grouped in one, under that name.

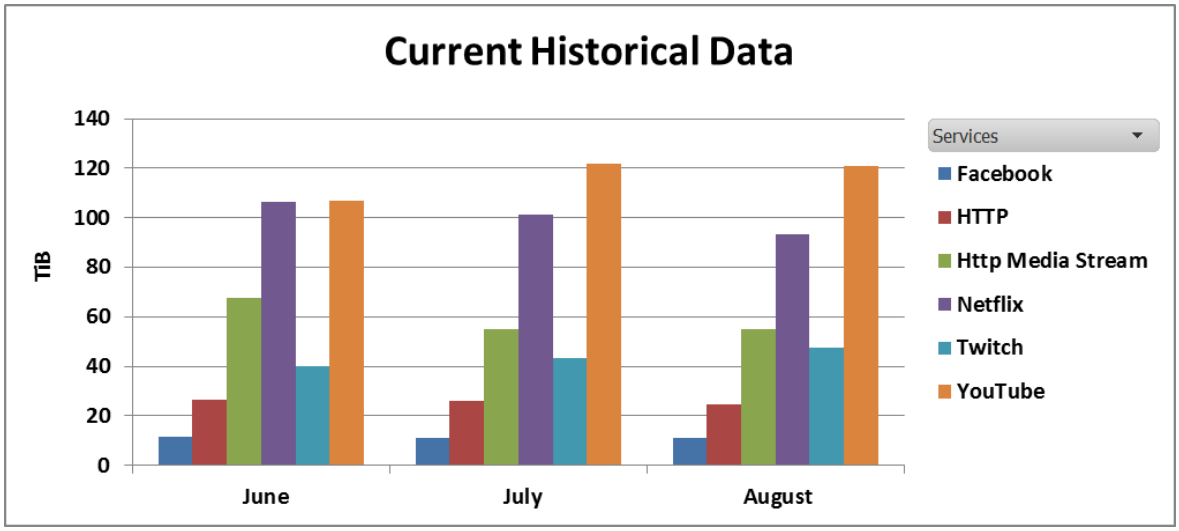

Figure 20. Current Services traffic at Anvia

7.3. Exporting Data

The time for capturing and exporting traffic in Vaasa was 3 months, from June till August 2015, however, PL still connected and collecting data. The process of exporting the data from PacketLogic is done based on some python scripts. Procera Networks provides a PacketLogic python API "*which enables programmatic configuration and retrieval of data from the PacketLogic system. This allows everything from small scripts retrieving statistics data to large programs integrating the PacketLogic with other systems to be written*" (PacketLogicNetworks, 2012); also Procera networks provides some examples in its webpage, these examples are provided with no guarantee that they will work for a given use. The examples can be used as a starting point for writing scripts for actual use. Procera Networks do not provide support for specific uses of these examples. Anvia works along with an additional company: VTT, who had a python script written for a previous project, this script was handed over to Anvia with the purpose to export the data from PacketLogic device. The data exported comes in a .CSV file with the information selected when the statistic object was created; the scripts can include or exclude nodes to be exported according to the measurement parameters and it runs these nodes in a tree mode starting for the first elements located at each node depth.

Next figure shows an example of the distribution organized in a tree.

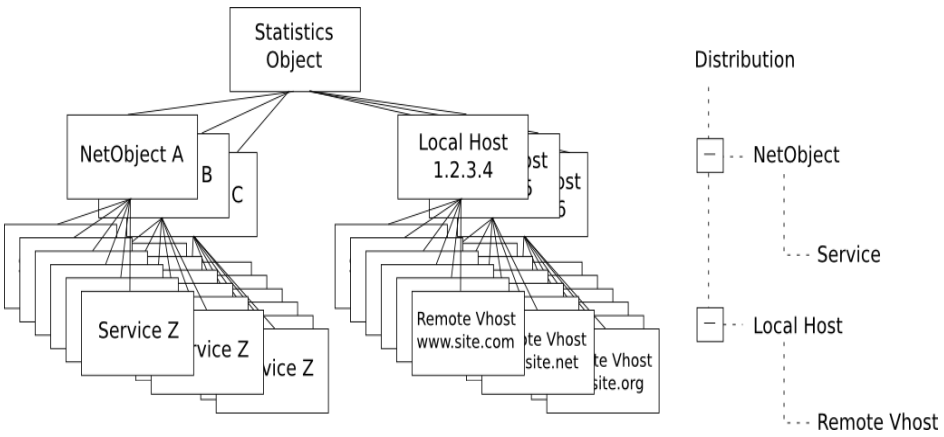

Figure 21. Distribution example (PacketLogicNetworks, 2012:75)

Python script used in this project is attached as an Appendix and since is confidential it will remain at Anvia´s headquarter in the private document.

7.3.1. Data Organization

To organize the data and the amount of files extracted from the PacketLogic database, it was designed, created and implemented a database in Microsoft Access to store all the information and facilitate the usage of this records to generate the forecasting models.
Next figure shows the entity-relationship model of Anvia's database

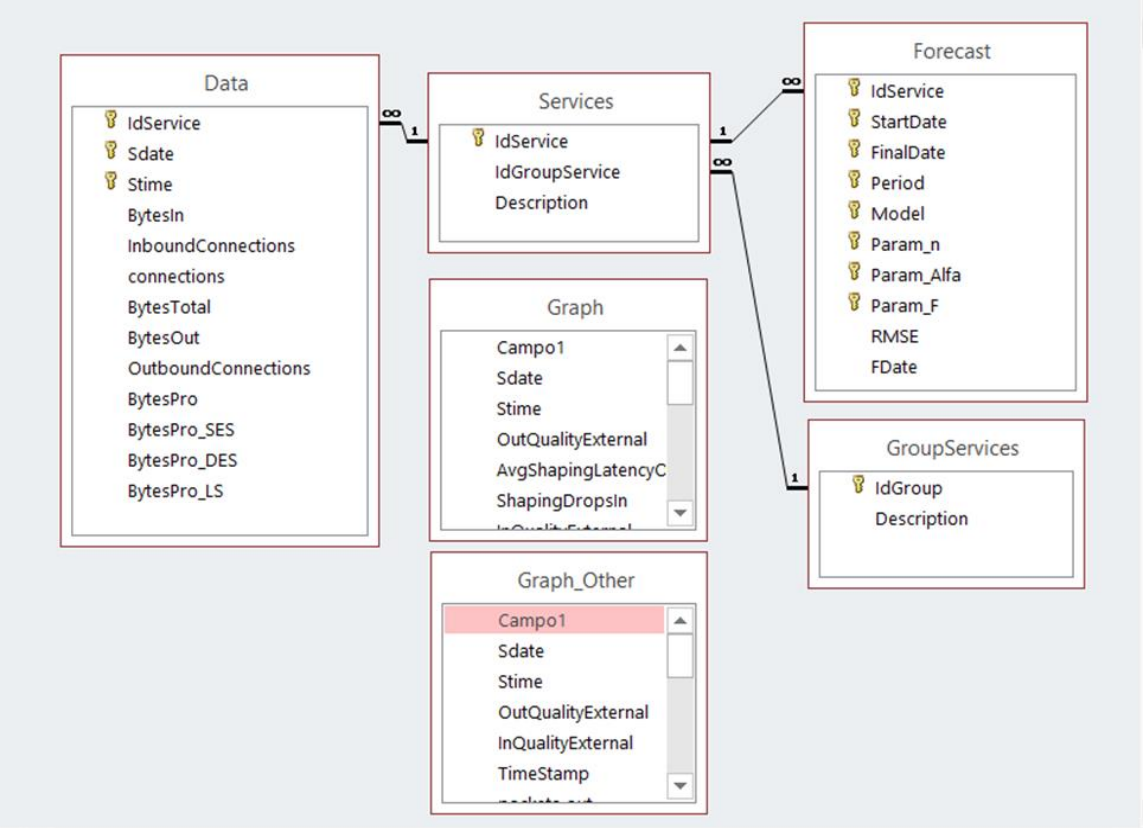

Figure 22. Entity- Relationship model

The database contains 6 tables with their attributes. Each table has a primary key which avoid data iteration. To import data to the database and analyze it with the forecasting models, it was necessary to build a user interface which is shown in the next figures.

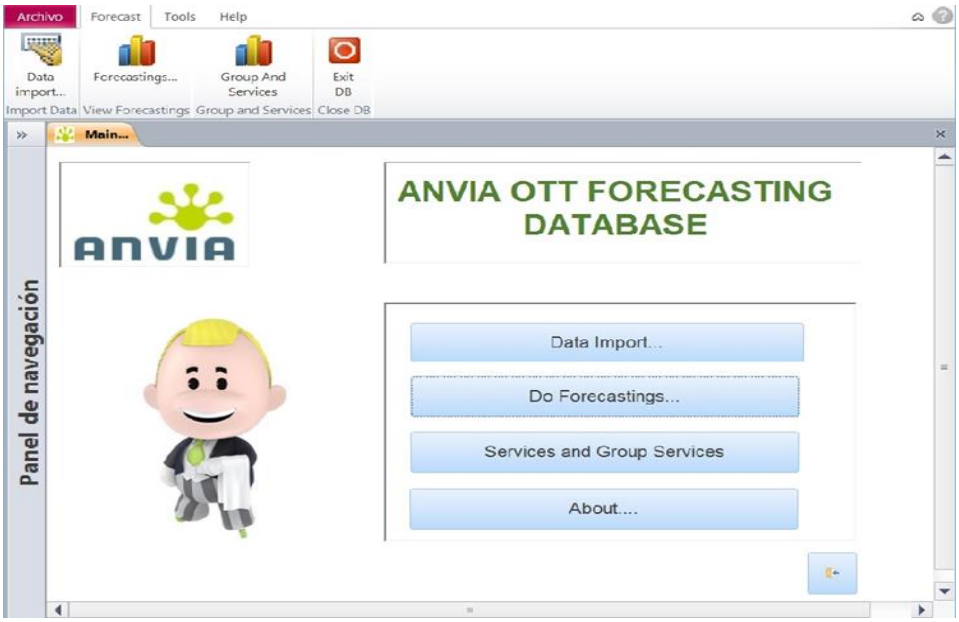

Figure 23. Database user interface main window

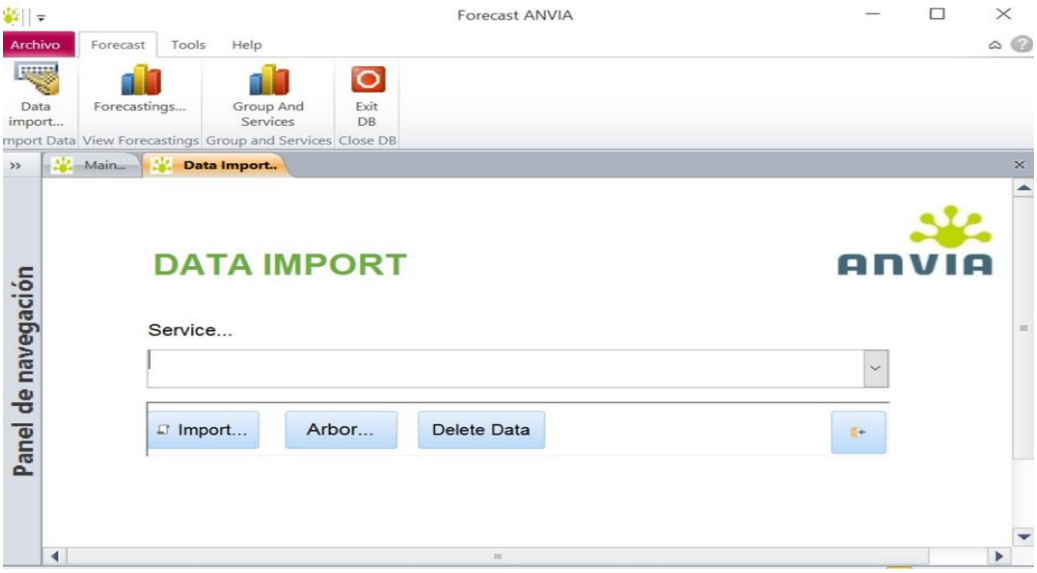

Figure 24. Data import interface

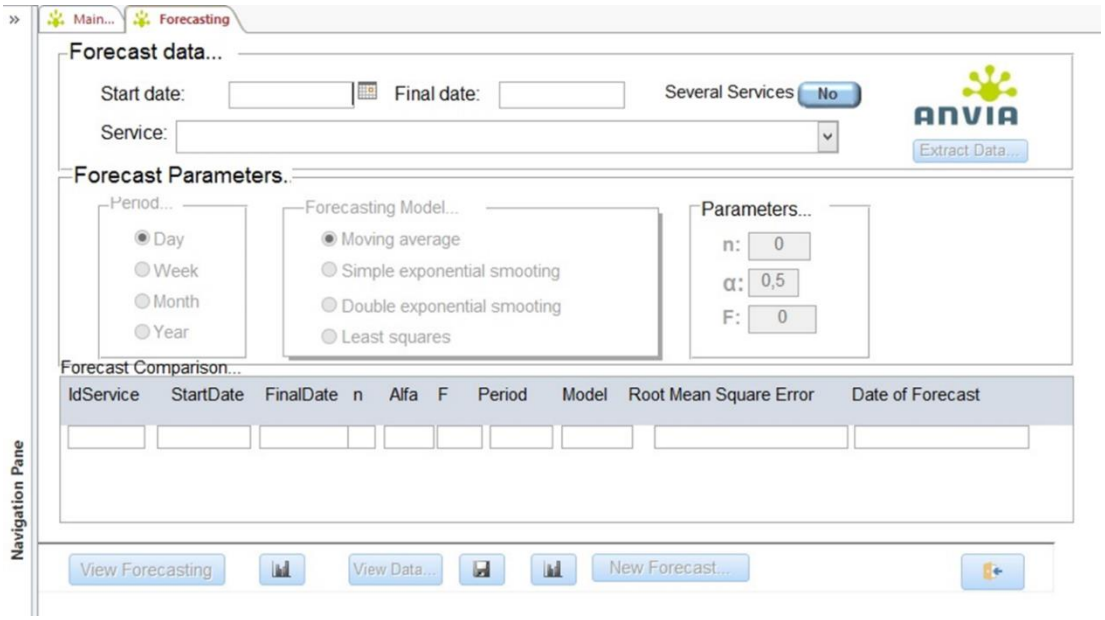

Figure 25. User's interface for forecasting models

For every forecasting technique, it was needed to write the specific code that calculates the amount of bytes which will predict the behavior for every category and service. (See 7.4.3 Models implemented at Anvia)

7.4. Forecasting Methods

Forecast is a method which tries to know the future behavior of any variable with a degree of certainty. There are three groups of available forecasting methods: Qualitative, Quantitative and Time series. They are distinguished by the relative accuracy of long term forecast compared to the short term, the required level of mathematical tools and the knowledge base as substrate projections.

All formal forecasting procedures comprise the extension of the past experiences to an uncertain future. Variables known implicitly in the forecasting models do not distinguish

the conditions that generated data in the past, or the conditions that will generate data in the future (Sipper & Bulfin Robert L., 1997).

The forecasting techniques operate on historical information which is achieved through four phases in the predicting process:

- Data collection
- Reduction or condensation data
- Construction of model
- Extrapolation model (Sipper et al. 1997).

7.4.1. Qualitative Methods

Methods of qualitative forecasts are used when there is no historical data and they are used to make generally long-term forecasts. These methods are based on the opinion of experts and the most common are:

- Visionary forecast
- Historical analogy
- Panel Consensus forecasting
- Delphi Method (Gor & Mohan, 2009)

7.4.2. Quantitative Methods

When there is historical data, the best frequently used methods are quantitative forecasts. These methods include univariate and multivariate techniques. Univariate analysis assumes that the variable under study depends on its past levels, they are usually time series analysis, These are the methods proposed at Anvia and implemented in this thesis; however, the multivariate analysis assumes that it is possible to determine the behavior of the variable that is under study from the levels of other variables under control, they are usually causal models. (Gor et al. 2009)

➢ Time Series Methods (Univariate Analysis)

Time series are sequences of evenly spaced data that are obtained by observing the variables in periodical intervals, either monthly, bimonthly, quarterly, annual, using historical data as the basis of estimating future outcomes; it assumes that the factors that have influenced the past will continue doing it in the future. They can be decomposed into trend, seasonal and random variations.

The trend is the gradual rising or descending movement of data over time. Changes in population, income, etc. influence the trend.

Seasonal Variation is the existence of a periodic pattern of behavior of the data. This may be due to the weather, customs, etc. and it occurs within a daily, weekly, monthly or annual period. (Arsham, 2015)

Random variations are "jumps" in the data, caused by chance and unusual situations. They are of short duration and are not repeated, or at least they don't do it with a certain frequency. Being random, they cannot be predicted.

The most used models are:

- Moving Averages
  - Simple moving Average
  - Double moving Average
- Exponential smoothing
  - Simple exponential smoothing
  - Double exponential smoothing (Brown method)
- Least Square (Arsham, 2015)

7.4.3. Methods implemented at Anvia.

7.4.3.1. Simple moving average

Simple moving average method is used when the recent sets of data points requires more importance while calculating the forecast.

Each point of a moving average time series is the arithmetic mean of a number of consecutive points in the series, where the number of points is selected in such a way that seasonal and / or irregular effects are eliminated. This number of point is represented in Anvia OTT Forecast system as ***n.***

This method is optimal for random or leveled patterns where the idea is to eliminate the impact of historical irregular elements by focusing on recent periods (Makridakis, Wheelwright, & Hyndman, 1998).

This method has been programmed in Microsoft Access using Visual Basic application language.

Next equation establishes the moving average method:

$$PM_t = \frac{X_t + X_{t-1} + X_{t-2} + \cdots + X_{t-n+1}}{n} \quad (1)$$

PM_t is the moving average in period ***t***

X_{t+1} is the forecast value for the next period

X_t is the real value observed in the period ***t***

Netflix is taken as example to show the behavior of this method. Using Anvia OTT forecast system, selecting data from June with an ***n*** = 5, **period** = day and **predicting** 5 days, it got the following results:

Table 1. Example of Moving average using Netflix

Period	BytesTotal	Moving Average
01-kesä-15	3,98172E+12	0
02-kesä-15	3,5025E+12	0
03-kesä-15	3,57276E+12	0
04-kesä-15	3,0939E+12	0
05-kesä-15	2,97643E+12	0
06-kesä-15	3,59426E+12	3,42546E+12
07-kesä-15	4,49786E+12	3,34797E+12
08-kesä-15	3,6449E+12	3,54704E+12
09-kesä-15	3,62636E+12	3,56147E+12
10-kesä-15	3,50383E+12	3,66796E+12
11-kesä-15	3,34969E+12	3,77344E+12
12-kesä-15	3,48138E+12	3,72453E+12
13-kesä-15	3,62292E+12	3,52123E+12
14-kesä-15	5,43329E+12	3,51683E+12
15-kesä-15	4,19581E+12	3,87822E+12
16-kesä-15		4,01662E+12
17-kesä-15		4,15E+12
18-kesä-15		4,28373E+12
19-kesä-15		4,41589E+12
20-kesä-15		4,21241E+12

n = 5 are the first 5 values in Bytes Total, calculating their average gives as result the first forecasted value which is June 6th.

Moving average values are very close to the real data.

Next figure shows the behavior of Moving average method implemented in Anvia's forecasting tool.

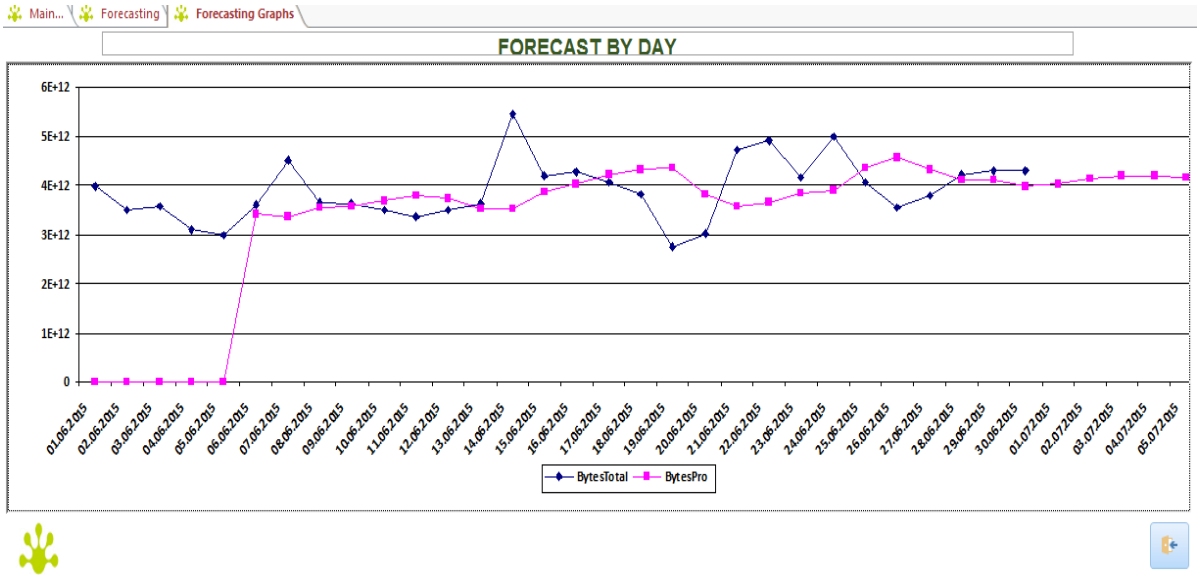

Figure 26. Comparative graph between real and forecasted data using moving average

7.4.3.2. Simple exponential smoothing

In this case the average of a time series is calculated with a self-correcting mechanism that pursues to adjust the forecasts to the opposite direction of past deviations through an adjustment that is affected by a coefficient of smoothing (Makridakis et al. 1998).

Although exponential smoothing calculates a forecast that is a complete average of all past data, it is not necessary to save all the data from the past to calculate the forecast for the next period, in fact, once the smoothing constant α is selected, it only requires two values of information to calculate the forecast (Gor & Mohan, 2009; Nahmias & Olsen, 2015:74).

The choice of the smoothing constant α is crucial in estimating future forecasts. It is preferable a small value for the smoothing constant if the historical data shows a clear random variability. The argument of this statement is that a big part of the forecast error is caused by the random variability, so a small value of α allows a better forecast (Makridakis et al. 1998).

$$\hat{X}_t = \hat{X}_{t-1} + \left(\alpha * (X_{t-1} - \hat{X}_{t-1})\right) \quad (2)$$

$\hat{X}_t$ Average of bytes in a period t

$\hat{X}_{t-1}$ Forecast of bytes in a period t-1

X_{t-1} Bytes in real time in a period t-1

α Coefficient of smoothing ($0 < \alpha < 1$)

Netflix is taken as example to show the behavior of this method. Using Anvia OTT forecast system, selecting data from June with an ***n*** = 5, **period** = day and **predicting** 5 days, it´s got the following results:

Table 2. Example of Simple Exponential Smoothing using Netflix

Period	BytesTotal	SES
01-kesä-15	3,98172E+12	0
02-kesä-15	3,5025E+12	3,98172E+12
03-kesä-15	3,57276E+12	3,98172E+12
04-kesä-15	3,0939E+12	3,77724E+12
05-kesä-15	2,97643E+12	3,43557E+12
06-kesä-15	3,59426E+12	3,206E+12
07-kesä-15	4,49786E+12	3,40013E+12
08-kesä-15	3,6449E+12	3,94899E+12
09-kesä-15	3,62636E+12	3,79695E+12
10-kesä-15	3,50383E+12	3,71165E+12
11-kesä-15	3,34969E+12	3,60774E+12
12-kesä-15	3,48138E+12	3,47871E+12
13-kesä-15	3,62292E+12	3,48005E+12
14-kesä-15	5,43329E+12	3,55148E+12
15-kesä-15	4,19581E+12	4,49239E+12
16-kesä-15		4,3441E+12
17-kesä-15		4,41824E+12
18-kesä-15		4,38117E+12
19-kesä-15		4,39971E+12
20-kesä-15		4,39044E+12

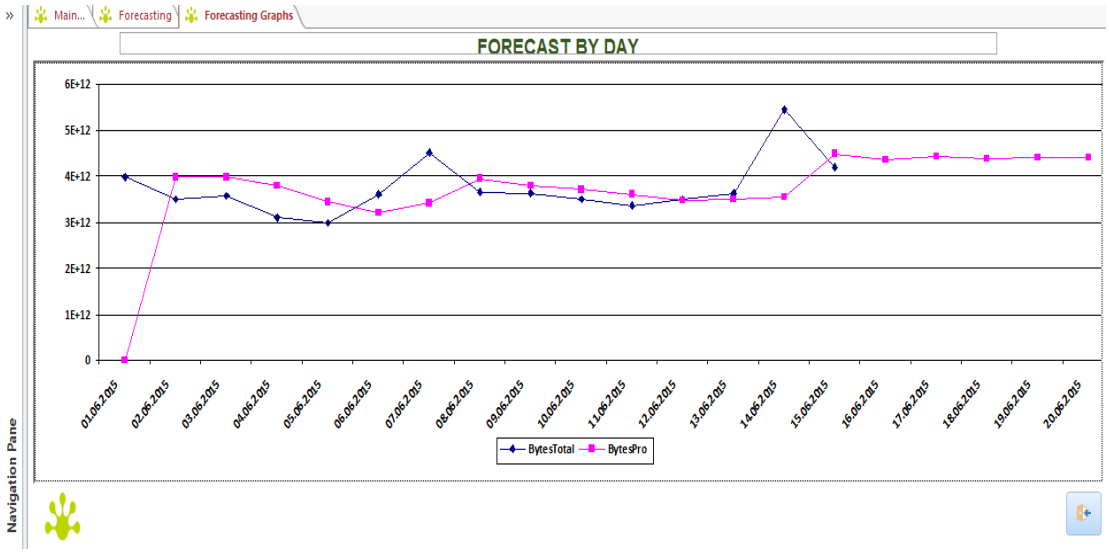

Figure 27. Comparative graph between real and forecasted data using SES

7.4.3.3. Double Exponential Smoothing or Holt Method

In some cases, it is identifiable certain behavior in a group of data that could may shed a clear trend or information allowing to anticipate future movements. Estimating a trend provides level of updates that mitigate the occasional changes of a time series. Charles Holt in 1957 developed a model of linear trends evolving in a time series and it can be used to generate forecasts, this model is called double exponential smoothing (Gardner, 2005:4).

The prediction of double exponential smoothing is optimal for data that have a tendency, at least locally, and a continuous seasonal pattern; this model intends to eliminate the impact of historical irregular elements with a focus on recent demand periods (NIST/SEMATECH, 2012; Gardner, 2005:6).

This method is based in 2 equations:

$$S_T = \alpha d_T + (1-\alpha)(S_{T-1} + B_{T-1}) \quad (3)$$

$$B_T = \beta(S_T - S_{T-1}) + (1-\beta)B_{T-1} \quad (4)$$

$$F_{T+k} = \boldsymbol{S_T} + kB_T \quad (5)$$

S_T Simple exponential smoothing value at the end of period T

B_T Double exponential smoothing value at the end of period T

β Constant for trend setting

k Determines the number of forecasts

F_{T+k} Forecast in period T+k

α Smoothing constant (NIST/SEMATECH, 2012)

The first equation gives an estimation of the series level in the period ***T*** and the second equation would produce an estimate of the slope of the trend line for period ***T.***

Netflix is taken as example to show the behavior of this method. Using Anvia OTT forecast system, selecting data from June with an ***n*** = 5, **period** = day and predicting 5 days, it got the following results:

Table 3. Example of Double Exponential Smoothing using Netflix

Period	BytesTotal	DES
01-kesä-15	3,98172E+12	0
02-kesä-15	3,5025E+12	0
03-kesä-15	3,57276E+12	0
04-kesä-15	3,0939E+12	0
05-kesä-15	2,97643E+12	0
06-kesä-15	3,59426E+12	0
07-kesä-15	4,49786E+12	0
08-kesä-15	3,6449E+12	0
09-kesä-15	3,62636E+12	0
10-kesä-15	3,50383E+12	0
11-kesä-15	3,34969E+12	0
12-kesä-15	3,48138E+12	0
13-kesä-15	3,62292E+12	0
14-kesä-15	5,43329E+12	0
15-kesä-15	4,19581E+12	0
16-kesä-15		3,49343E+12
17-kesä-15		3,46763E+12
18-kesä-15		3,44183E+12
19-kesä-15		3,41603E+12
20-kesä-15		3,39024E+12

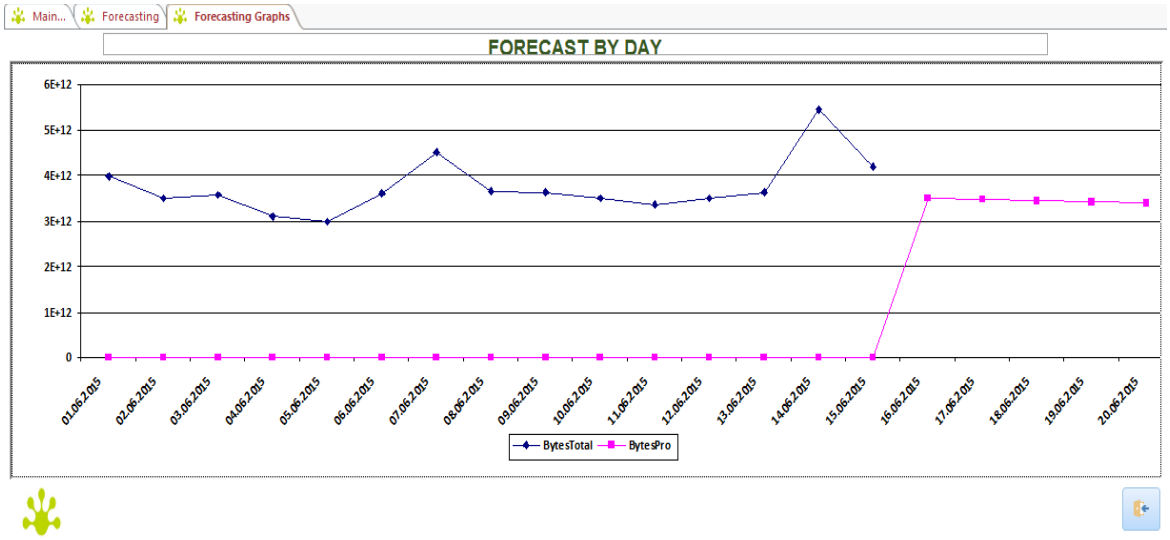

Figure 28. Comparative graph between real and forecasted data using DES

7.4.3.4. Least Squares

The least squares method is used to interpolate values, that is to say that it is used to search unknown values by referencing other samples of the same event.

The method consists in drawing a line or curve, as near as possible to the points, which are determined by the coordinates [x, f (x)].

It is clear that this method is simple to implement but is not entirely accurate, but it does provide an acceptable interpolation. (Makridakis et al. 1998)

The method of least squares or linear regression yields the slope ***a*** of the line and the ordinate ***b*** in the origin, corresponding to the line Y=Ax+B that best fits ***n*** data (Xi, Yi) which means that it is possible to establish a functional relationship among two variables; where **X** is the independent variable and ***Y*** the dependent variable, in other words, Y depends on X. (Makridakis et al. 1998)

$$Y = Ax + B \tag{6}$$

There are some restrictions about this method such as:

• It requires having at least ten measurements under the same experimental conditions.

• These results should be described by a known probability distribution. The most common is the normal or Gaussian distribution. (Makridakis et al. 1998)

Netflix is taken as example to show the behavior of this method. Using Anvia OTT forecast system, selecting data from June with an ***n*** = 5, **period** = day and predicting 5 days, it got the following results:

Table 4. Example of Least Square using Netflix

Period	BytesTotal	Least Square
01-kesä-15	3,98172E+12	3,36472E+12
02-kesä-15	3,5025E+12	3,41812E+12
03-kesä-15	3,57276E+12	3,47151E+12
04-kesä-15	3,0939E+12	3,52491E+12
05-kesä-15	2,97643E+12	3,57831E+12
06-kesä-15	3,59426E+12	3,63171E+12
07-kesä-15	4,49786E+12	3,68511E+12
08-kesä-15	3,6449E+12	3,73851E+12
09-kesä-15	3,62636E+12	3,7919E+12
10-kesä-15	3,50383E+12	3,8453E+12
11-kesä-15	3,34969E+12	3,8987E+12
12-kesä-15	3,48138E+12	3,9521E+12
13-kesä-15	3,62292E+12	4,0055E+12
14-kesä-15	5,43329E+12	4,0589E+12
15-kesä-15	4,19581E+12	4,11229E+12
16-kesä-15		4,16569E+12
17-kesä-15		4,21909E+12
18-kesä-15		4,27249E+12
19-kesä-15		4,32589E+12
20-kesä-15		4,37929E+12

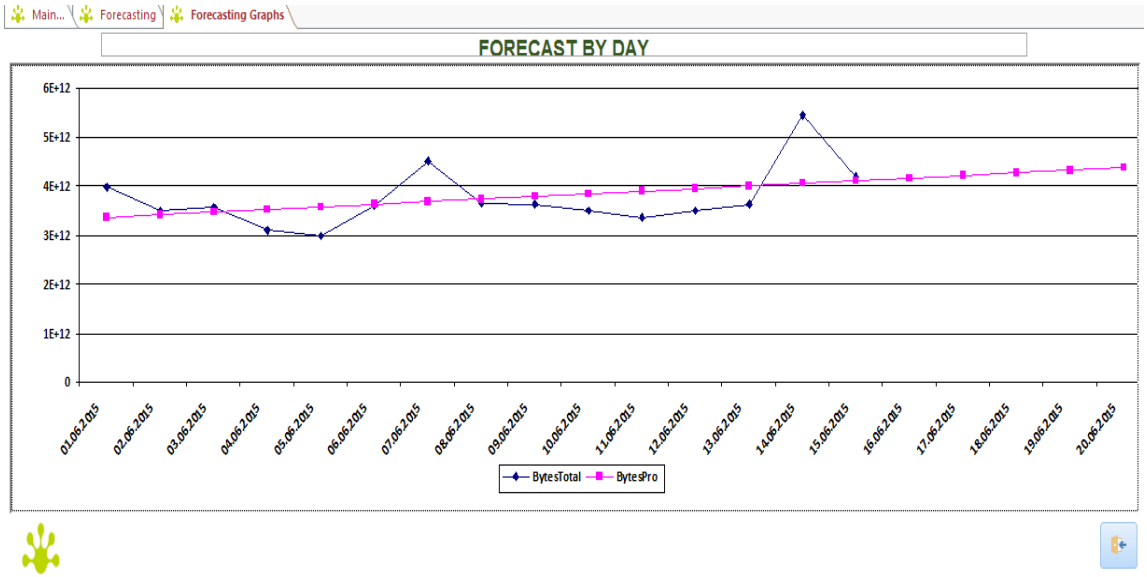

Figure 29. Comparative graph between real and forecasted data using Least Square

8. PREDICTION FOR OTT SERVICES NOV 2015

This part of the document gives a description of the results obtained after using ***Anvia OTT forecast system***, based on historical data collected from June 2015 to August 2015.

8.1. Forecast for services of interest to Anvia

8.1.1. Netflix

Analysis for this service using the forecast models applied at Anvia's OTT forecast database and the 4 different periods.

Period = Day.

Parameters: n= 7, alpha= 0.5 and F=30

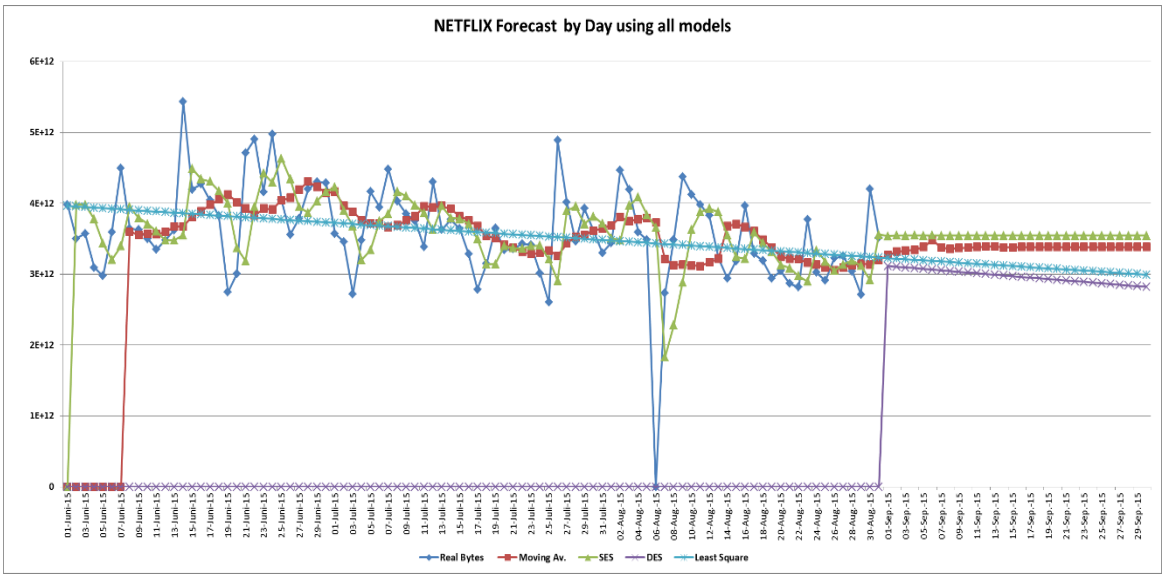

Figure 30. Netflix Prediction using all models (Days)

Based on the forecast models, Moving Average and SES, the image shows that the trend of service usage lean towards to stability, unlike to DES and Least Squares models that show a descending trend. (See Appendix 5. Netflix Forecasting Data by Day).

Period: Week

Parameters: n=3, alpha= 0.5 and F=4.

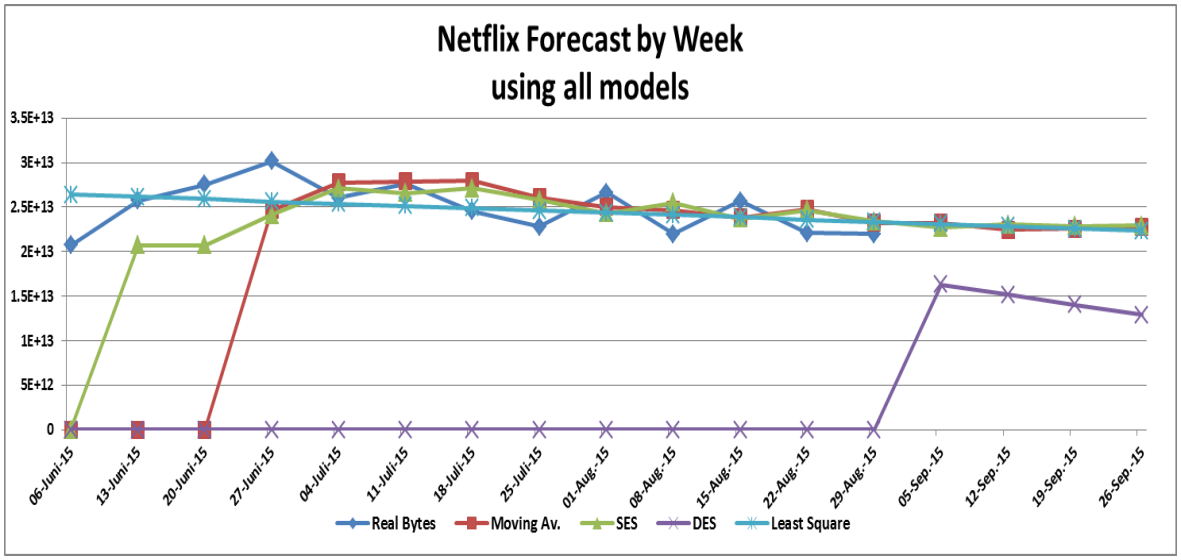

Figure 31. Netflix Prediction using all models (Week)

As shown in the forecast by days, the prediction confirms that the Service usage tendency lean towards to descent. (See appendix 6. Netflix Forecasting Data by Week).

Period: Month

Parameters: n=2, alpha= 0.5 and F=3.

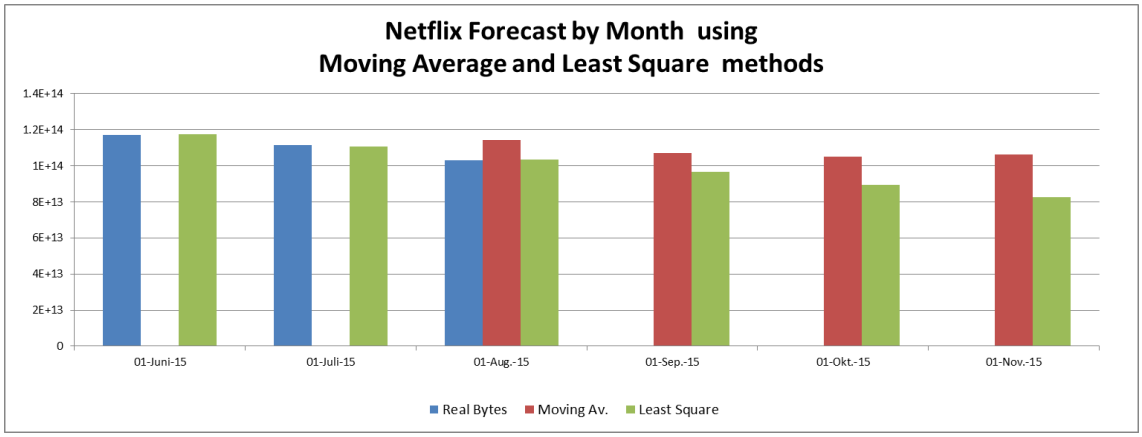

Figure 32. Netflix Prediction using two models (Month)

Although this forecast has only three months of historical data, the prediction shows a descendent trend (See Appendix 7. Netflix Forecasting Data by Month).

8.1.2. YouTube

Analysis for this service using the forecast models applied at Anvia's OTT forecast database and the 4 different periods.

Period: Day

Parameters: n=7, alpha= 0.5 and F=30.

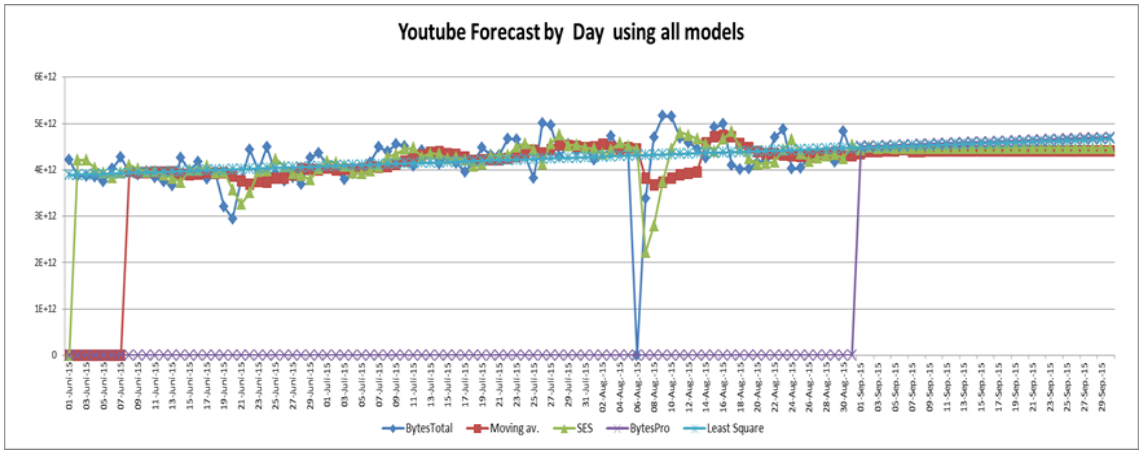

Figure 33. YouTube prediction using all models (Days)

Looking at the forecast trend , it is obvious an increment in the service usage agreeing all models with the same behavior (see Appendix 8. Youtube Forecasting Data by day).

Period: Week

Parameters: n=3, alpha= 0.5 and F=4

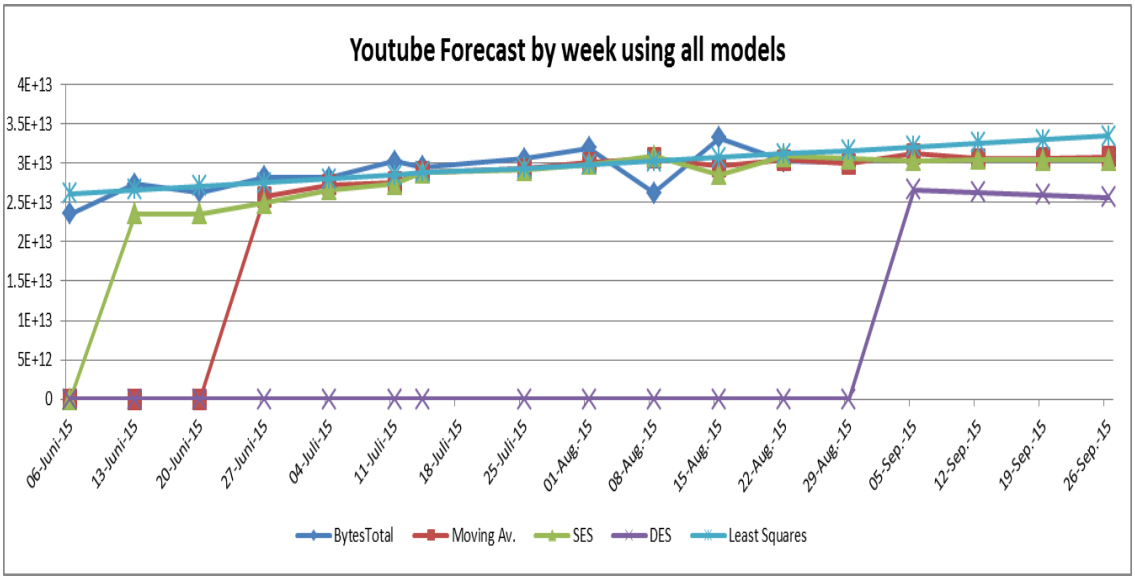

Figure 34. YouTube Prediction using all models (Week)

It is visible the growth in the service usage (See Appendix 9 YouTube Forecasting Data by Week).

Period: Month

Parameters: n= 2, alpha= 0.5 and F=3.

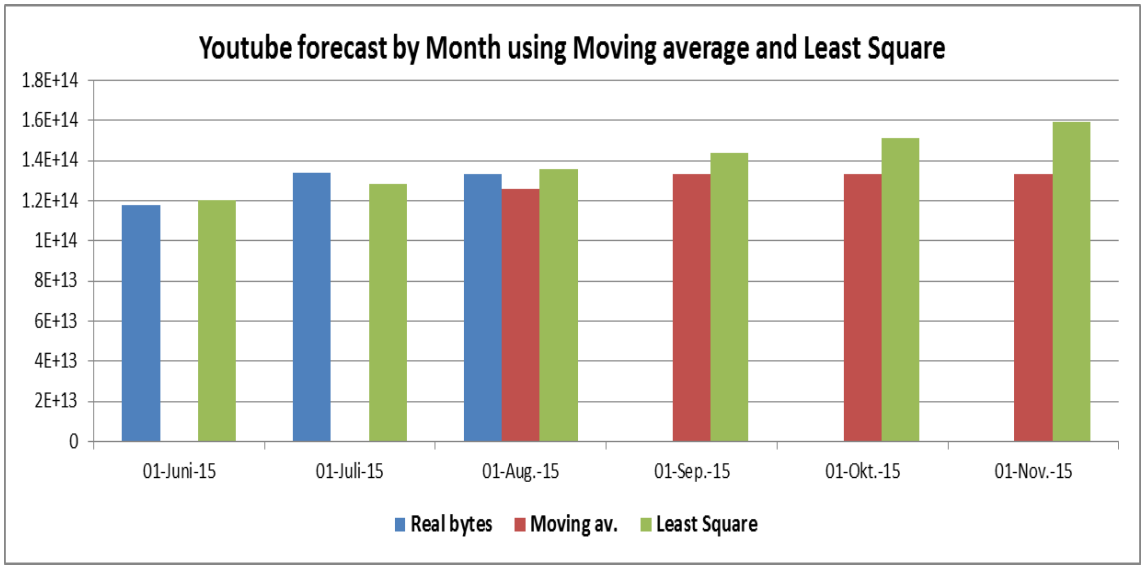

Figure 35. YouTube prediction using two models (Month)

Once again the forecast shows a trend to growth (See Appendix 10. YouTube Forecasting Data by Month).

8.1.3. HTTP media Stream.

Analysis for this service using the forecast models applied at Anvia's OTT forecast database and the 4 different periods.

Period: Day

Parameters: n= 7, alpha= 0.5 and F=30.

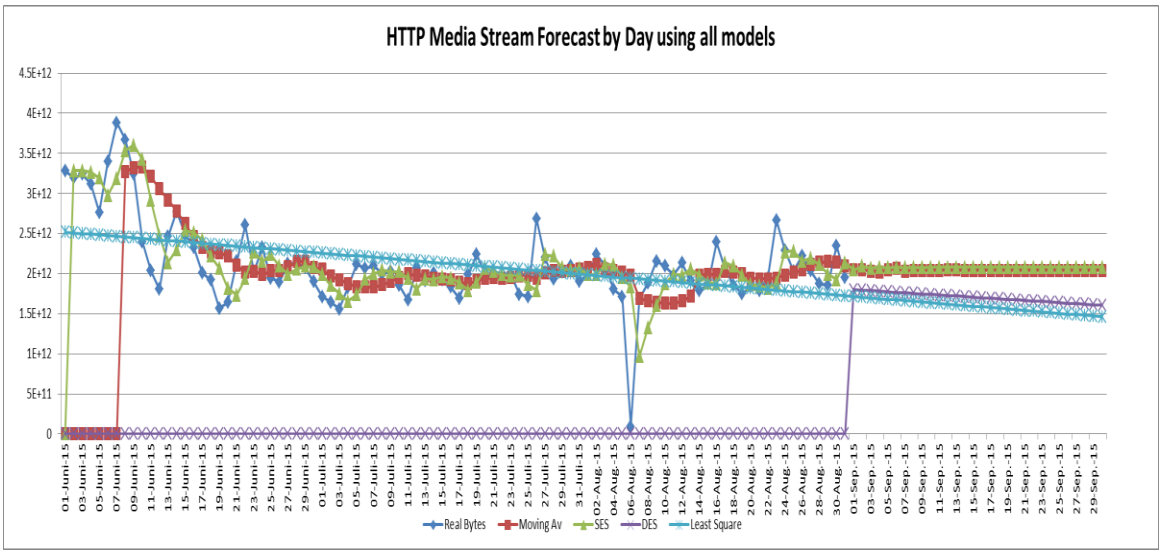

Figure 36. HTTP media Stream Prediction using all models (Days)

Based on the forecast models, Moving Average and SES, the image shows that the trend of service usage lean towards to stability, unlike to DES and Least Squares models that show a descending trend. (See Appendix 11. HTTP media stream Forecasting Data by Day).

Period: Week

Parameters: n= 3, alpha= 0.5 and F=4.

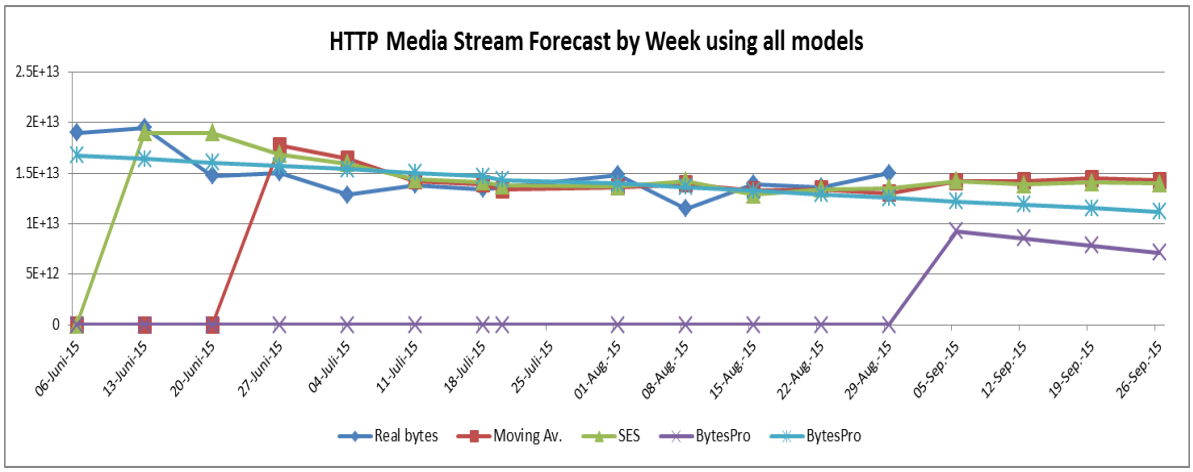

Figure 37. HTTP Media Stream prediction using all models (Week)

It is seen in the graph a forecast similar to the one shown in the graph by day (See Appendix 12. HTTP media Stream forecasting data by Week

Period: Month

Parameters: n= 2, alpha= 0.5 and F=3.

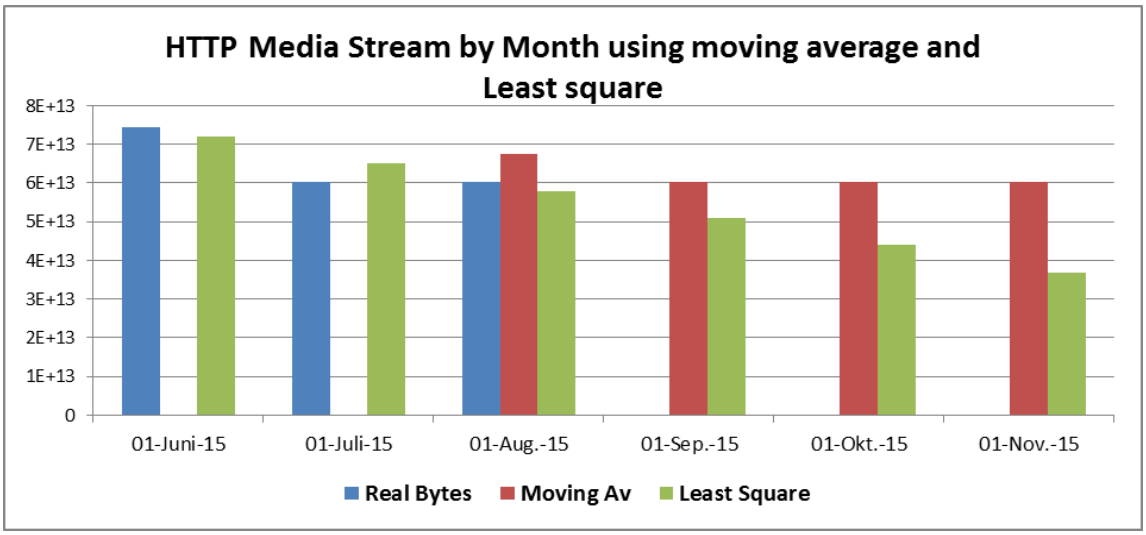

Figure 38. HTTP Media Stream using two models (Month)

Although this forecast has only three months of historical data, the prediction shows a descending trend (See Appendix 13. HTTP media Stream Forecasting Data by Month).

8.1.4. Twitch.

Analysis for this service using the forecast models applied at Anvia's OTT forecast database and the 4 different periods.

Period: Day

Parameters: n= 7, alpha= 0.5 y and F=30.

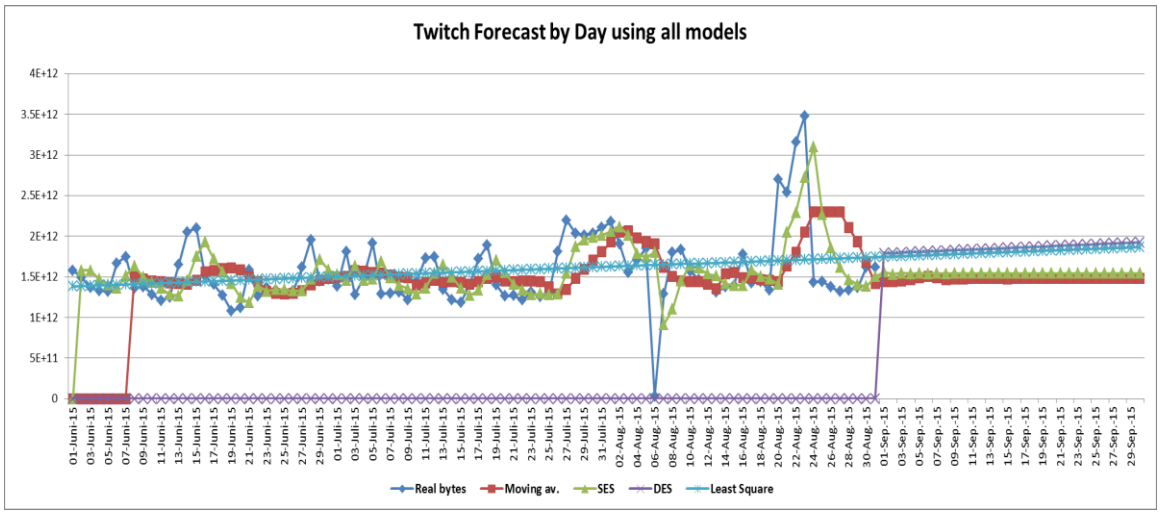

Figure 39. Twitch Prediction suing all models (Days)

Looking at forecast trends, they all show an increament usage of the service and the models have similar behaviour (see Appendix 14. Twitch forecasting data by day). The real data shows some outliers datapoints, on the weekend of Aug-22; an increased usage of the service was due to an online game competition.

Period: Week

Parameters: n= 3, alpha= 0.5 and F=4

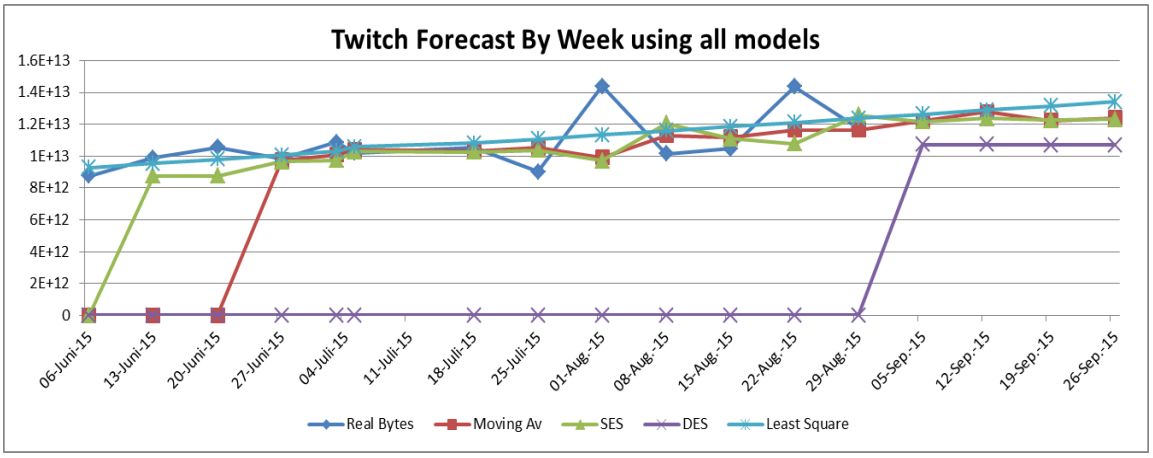

Figure 40. Twitch Prediction using all models (week)

This forecast contrasts with the trend shown in the forecast by days, (See Appendix 15 Twitch Forecasting Data by Week).

Period: Month

Parameters: n= 2, alpha= 0.5 and F=3

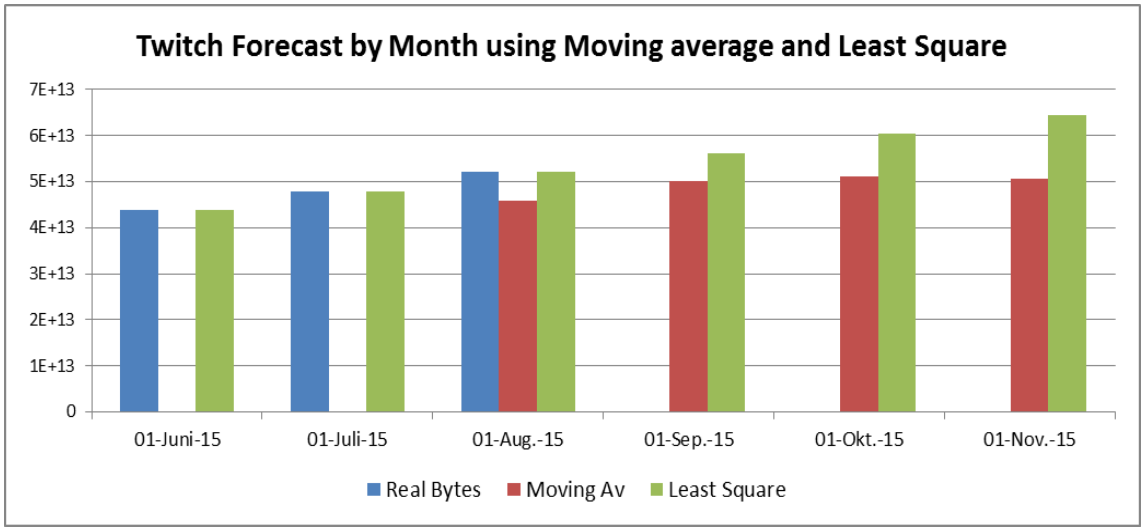

Figure 41. Twitch Prediction using two models (Month)

Having only 3 real data points the Forecast done by month retains the trend shown in the above periods (See appendix 16. Twitch Forecasting data by Month).

8.1.5. Facebook.

Analysis for this service using the forecast models applied at Anvia's OTT forecast database and the 4 different periods.

Period: Day

Parameters n= 7, alpha= 0.5 and F=30.

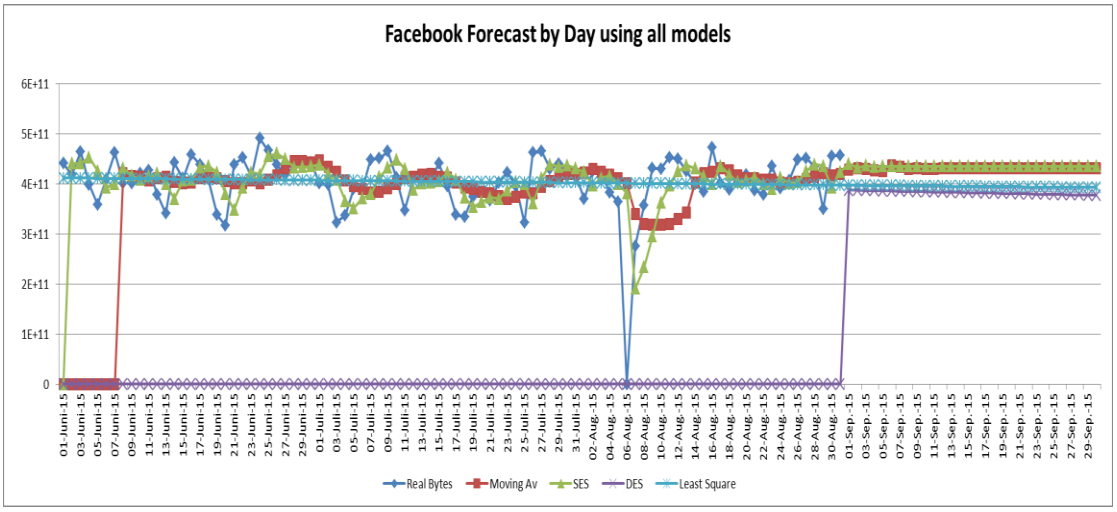

Figure 42. Facebook prediction using all models (Days)

The forecast results show that the service has a trend to be stable. (See Appendix 17. Facebook Forecasting Data by Day).

Period: week

Parameters: n= 3, alpha= 0.5 and F=4.

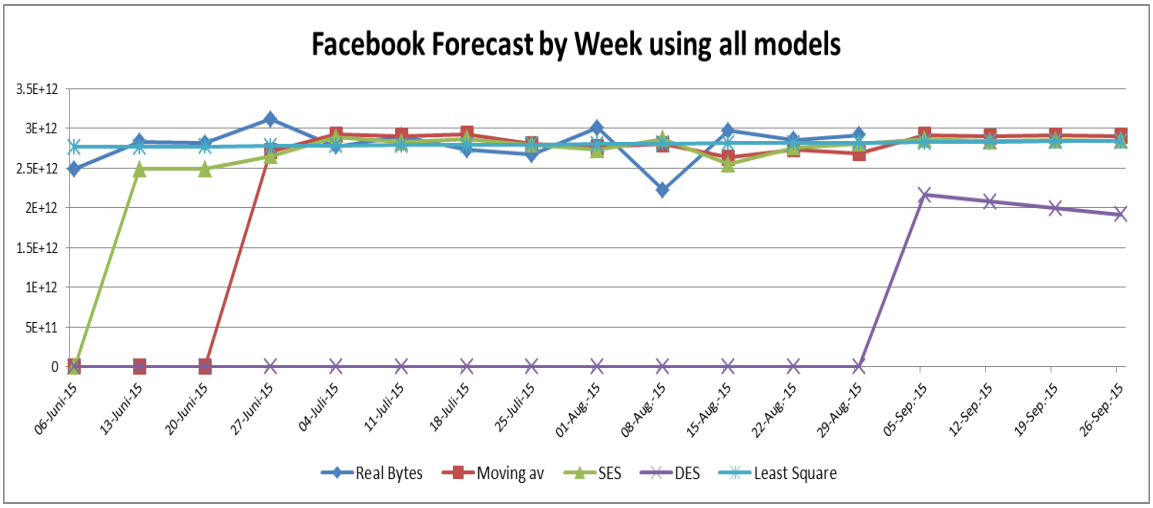

Figure 43. Facebook prediction using all models (week)

(See Appendix 18. Facebook Forecasting Data by Week).

Period: Month

Parameters: n= 2, alpha= 0.5 and F=3

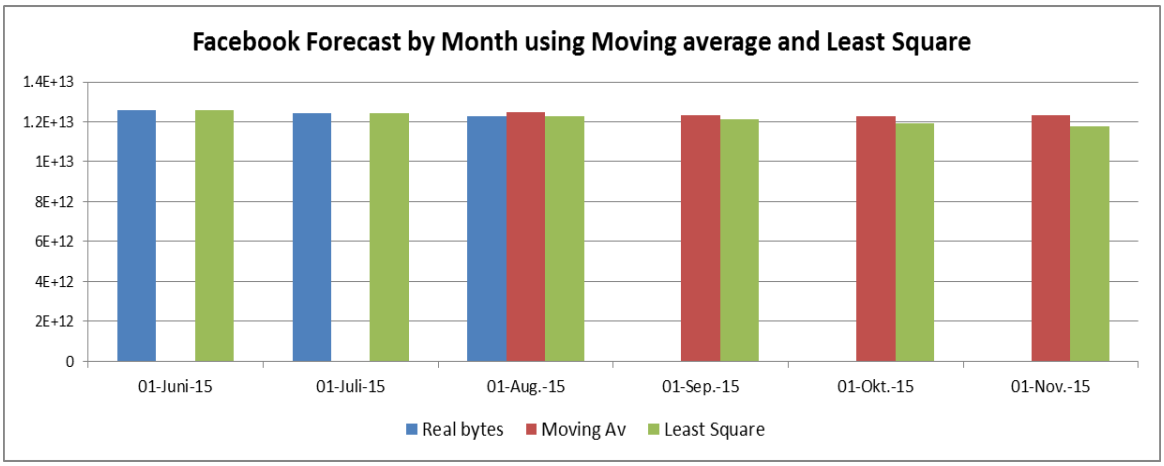

Figure 44. Facebook prediction using two models (Month)

The trend shown in the forecast by month is similar to the one shown in the previous period; however since historical data points are few, adding more information to the database could improve the behavior of the forecasting models (See Appendix 19. Facebook Forecasting Data by Month).

8.1.6. HTTP.

Analysis for this service using the forecast models applied at Anvia's OTT forecast database and the 4 different periods.

Period: Day

Parameters: n= 7, alpha= 0.5 and F=30.

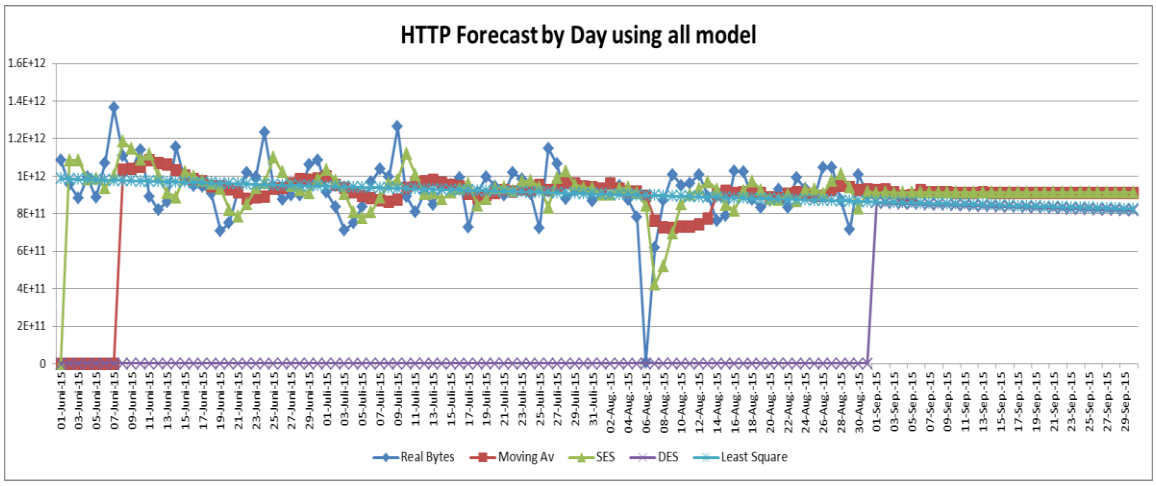

Figure 45. HTTP prediction using all models (Days)

The forecast by day indicates that the usage trend of the service tends to remain stable, although the models Moving Average and Least Square indicate slight tendency to decrease (See Appendix 20. HTTP Forecasting Data by Day).

Period: Week

Parameters: n= 3, alpha= 0.5 and F=4.

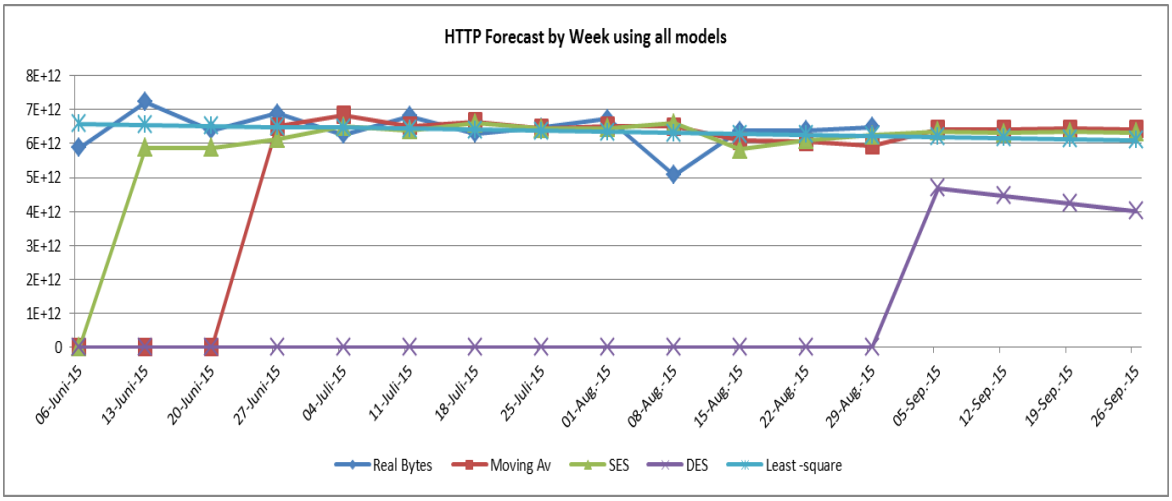

Figure 46. HTTP Prediction using all models (Week)

(See Appendix 21. HTTP Forecasting Data by Day).

Period: Month

Parameters: n= 2, alpha= 0.5 and F=3

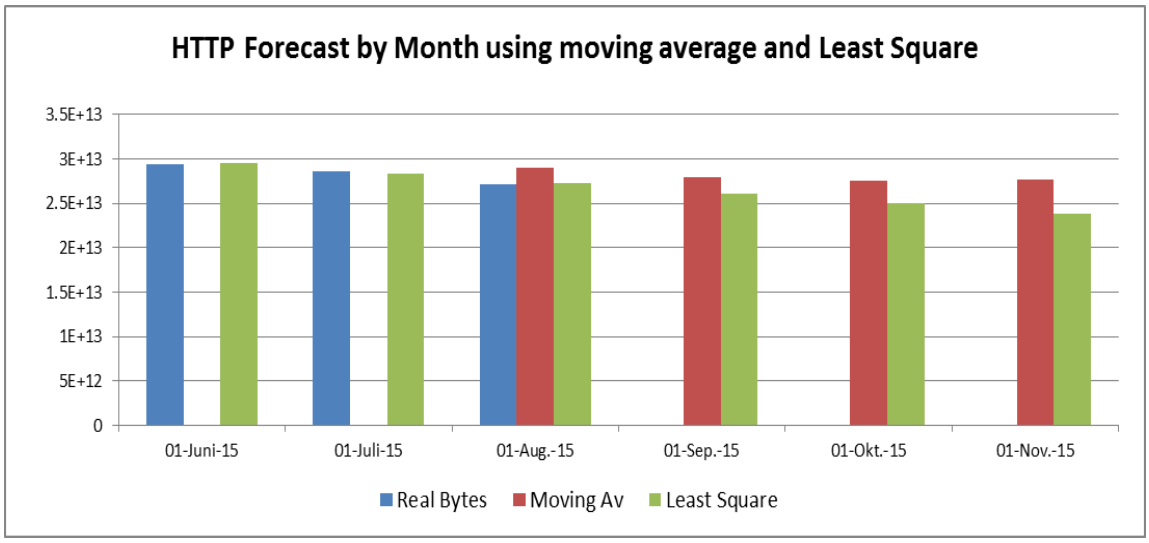

Figure 47. HTTP prediction using two models (Month)

The forecast shows a small tendency to decrease (See Appendix 22. HTTP Forecasting data by month).

9. CONCLUSIONS AND RECOMMENDATIONS

The analysis in this report about the OTT services and especially video streaming shows that these services are a reality which acceptance each year exceeds the forecasts marked.

In this environment with continuous evolution, patterns behaviors associated with technological progressions and services deals are changing the way people understand the communications. These changes have also affected the video entertainment consumption, modifying the traditional understanding of the sector and introducing unfamiliar models in terms of delivery and monetization of services.

It is possible that new business models appear in which network operators could also become content producer, in order to be more attractive to new users and keeping the current ones.

After several predictions made based on available historical data it is important to highlight that the obtained results from the models are consistent with what has been happening with the real data, authorizing to assume that the mathematical models used for different projections, predicted acceptably the future usage behavior of the accessible services captured by Procera PacketLogic.

The periods “Month” and “year” at the moment have not the most successful results since there is not enough historical data, however as more data is added to the database the better and more positive forecasts could be obtained.

It would be advisable to incorporate into the forecasts models, a new model that incorporates the seasonal factor, although it still has not enough data to do such forecasting, it could be useful when collected data from one year would be available in the database. A recommended type of model could be Triple Exponential Smoothing – or winter method.

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APPENDIX 1. Visual Basic Application Script: Moving Average method

```
Private Sub bc_SeeForecastingsPM_Click()
'Code to go over the data table doing moving average forecasting
    Dim Rs As DAO.Recordset
    Dim PeriodActual As Date
    Dim NPro As Integer 'Variable to store the day of the record in current process
    Dim BTotal, Prom, RMSE As Double 'Variables to accumulate the total range to the average
    Dim Servicio, sqlInsertar As String 'Store the IdService of the record in process
    Dim Rango() As Double 'Vector where the range to forecast is stored

    'Open the table to go over its data
    Set Rs = CurrentDb.OpenRecordset("Data_Forecast")
   'If there are records to process it goes over them
    If Rs.RecordCount > Forms!frm_Forecasts!Step Then
        ReDim Rango(Forms!frm_Forecasts!Step)
        'Start accumulators
        Prom = 0
        BTotal = 0
        NPro = 0
        RMSE = 0
        'Locate the prompter on the first record in the table
        Rs.MoveFirst

        'Go over the first records till complete the range size in Forms!frm_Forecasts!Step
        For i = 1 To Forms!frm_Forecasts!Step
      Rango(i) = Rs!BytesTotal.Value
      BTotal = BTotal + Rs!BytesTotal.Value
      'Store the data from the record in current process; they will be inserted in final  record with the
      forecasting
      PeriodActual = Rs!Period.Value
      Servicio = Rs!IdService.Value
     'Jump to the next record
     Rs.MoveNext
    Next
   'Go over the rest of the table
   Do While Not Rs.EOF
        'Calculate the average for this range
        Prom = (BTotal / Forms!frm_Forecasts!Step)
       'Store the data from the record in current process, they will be inserted in final record with the
        forecasting
         PeriodActual = Rs!Period.Value
         Servicio = Rs!IdService.Value
         'Store the forecasting value
         Rs.Edit
        Rs!BytesPro.Value = Prom
       Rs.Update

    'Calculate the error for this forecast
    RMSE = RMSE + (Rs!BytesTotal.Value - Prom) ^ 2
    NPro = NPro + 1
```

```
  'Calculate the new accumulate value
  BTotal = BTotal + Rs!BytesTotal.Value - Rango(1)

  'Move the stored data in the vector so the second data jump to the first place
  For i = 1 To (Forms!frm_Forecasts!Step - 1)
        Rango(i) = Rango(i + 1)
  Next
  'Store the value of the last record in the vector
  Rango(Forms!frm_Forecasts!Step) = Rs!BytesTotal.Value
  'Jump to the next record on the table
  Rs.MoveNext
  Loop
       Prom = (BTotal / Forms!frm_Forecasts!Step
       'Find how many days to increment the period
         Inc = IncPeriod(PeriodActual)
         'Calculate the new period
        PeriodActual = PeriodActual + Inc
        'Deactivate messages in the system
        DoCmd.SetWarnings False       }

'Forecastings will be done till  Forms!frm_Forecasts!NForecast
For l = 1 To Forms!frm_Forecasts!NForecast - 1
   'Inserto un registro para poner allí el valor pronosticado
   sqlInsertar = "insert into Data_Forecast (Period,IdService, BytesPro) values ('" &
     PeriodActual & "', '" & Servicio & "', '" & Prom & "')"
   DoCmd.RunSQL sqlInsertar
   'Calculate the new acumulate value
   BTotal = BTotal + Prom - Rango(1)

   ‘Move the stored data in the vector so the first value will be the first one
  For i = 1 To (Forms!frm_Forecasts!Step - 1)
       Rango(i) = Rango(i + 1)
  Next
  'Store the value of the Forecasting in the last field in the vector
  Rango(Forms!frm_Forecasts!Step) = Prom
  'Calculate the Forecasting in the range
   Prom = (BTotal / Forms!frm_Forecasts!Step)
   'Find how many days can increment for the period
   Inc = IncPeriod(PeriodActual)
   PeriodActual = PeriodActual + Inc
 Next
'Calculate the Mean Square Error
 RMSE = RMSE / NPro
 RMSE = Sqr(RMSE)
 'Insert a record to store in it the foecasting value
 sqlInsertar = "insert into Data_Forecast (Period,IdService, BytesPro) values ('" &
 PeriodActual & "', '" & Servicio & "', '" & Prom & "')"
 DoCmd.RunSQL sqlInsertar
 'Store the forecasting data
 sqlInsertar = "insert into Forecast (IdService, StartDate, FinalDate, Period, Model,
 Param_N, Param_Alfa, Param_F, FDate, RMSE) values ('" & Servicio & "', '" &
 Me.StarDate & "', '" & Me.FinalDate & "', '" & Me.go_Period & "', '" &
```

```
        Me.go_Forecasting & "', '" & Me.Step & "', '" & Me.Alfa & "', '" & Me.NForecast &
        "', '" & Now() & "', '" & RMSE & "')"
        DoCmd.RunSQL sqlInsertar
        'Update the view of the form on screen
        Forms!frm_Forecasts!frm_His_Forecast.Form.Requery
        DoCmd.SetWarnings True 'Activate messages from the system
        rta = MsgBox("Forecasting process ended correctly for: " & Servicio, vbOKOnly,
        "Forecastings...")
    Else
        MsgBox ("There are not enough data to do the forecasting with n= " & Forms!frm_Forecasts!Step)
    End If
    Rs.Close
End Sub
```

APPENDIX 2. VBA Script: Simple Exponential Smoothing Method

```
Private Sub bc_ViewForeCastingsSES_Click()
    'Code to go over the data table doing Simple exponential smoothing
    Dim Rs As DAO.Recordset
    Dim PeriodActual As Date
    Dim NError As Integer 'Variable that stores the number of errors equal to the total data to forecast and the
    record in process
    Dim NReg, NPro As Integer 'Store the number of the record on process
    Dim ProAnt, ProSig, VrRealAnt, RMSE As Double 'Variable to accumulate the actual  forecasting and the
    next forecasting
    Dim Servicio, sqlInsertar As String ' Store the IdService of the record in process

    'Open the table to go over it
    Set Rs = CurrentDb.OpenRecordset("Data_Forecast")
    'Calculate the number of records to process
    NReg = Rs.RecordCount
    'code of the service in process
    Servicio = Rs!IdService.Value
    'Start variables to accumulate the Root Mean Squares Error
    RMSE = 0 'Accumulate the Mean Square Error
    NPro = 0 'Accumulate the amount of forecast data

    'Validate if there are enough data to do forecasting
    If NReg > 3 Then
        'If there are records to process, this code goes over them
        Rs.MoveFirst
        'Define the initial forecast as the first known data
        VrRealAnt = Rs!BytesTotal.Value
        ProAnt = VrRealAnt
        'Take the value of Actual period
        PeriodActual = Rs!Period.Value
        'The second forecast is the real initial value
        Rs.MoveNext
        Rs.Edit
        Rs!BytesPro.Value = VrRealAnt
        Rs.Update
        'Jump to the next forecast
        Rs.MoveNext
            Do While Not Rs.EOF
                    'Calculate the next forecasting
                     ProSig = Forms!frm_Forecasts!Alfa * VrRealAnt + (1 - Forms!frm_Forecasts!Alfa)
                    * ProAnt
                    'Accumulate the Root Mean Squares Error
                    RMSE = RMSE + (Rs!BytesTotal.Value - ProSig) ^ 2
                     NPro = NPro + 1
                    'Store the values to do the next forecast
                    VrRealAnt = Rs!BytesTotal.Value
                    ProAnt = ProSig
                    'Store the actual data
                     PeriodActual = Rs!Period.Value
```

```
        'Store the actual forecast
        Rs.Edit
        Rs!BytesPro.Value = ProSig
        Rs.Update
        Rs.MoveNext
      Loop
      'Updates the view of the historic forecasting form
      Forms!frm_Forecasts!frm_His_Forecast.Form.Requery
      DoCmd.SetWarnings False 'Deactivate the system messages
      For i = 1 To Forms!frm_Forecasts!NForecast
        'Next forecasting to forecast
        PeriodActual = PeriodActual + IncPeriod(PeriodActual)
        'New Forecasting
        ProSig = Forms!frm_Forecasts!Alfa * VrRealAnt + (1 - Forms!frm_Forecasts!Alfa)
       * ProAnt
        'Stores values to do next forecasting
        VrRealAnt = ProAnt
        ProAnt = ProSig
        'Insert a new record to store in there the new forecast value
        sqlInsertar = "insert into Data_Forecast (Period,IdService, BytesPro) values ('" &
        PeriodActual & "', '" & Servicio & "', '" & ProSig & "')"
        DoCmd.RunSQL sqlInsertar
      Next

      'Calculate the Root Mean Squares Erroro (RMSE)
      RMSE = RMSE / NPro
      RMSE = Sqr(RMSE)

      'Store the data for the forecast in the form His_Forecast
      sqlInsertar = "insert into Forecast (IdService, StartDate, FinalDate, Period, Model, Param_N,
      Param_Alfa, Param_F, FDate, RMSE) values ('" & Servicio & "', '" & Me.StarDate & "', '" &
      Me.FinalDate & "', '" & Me.go_Period & "', '" & Me.go_Forecasting _ & "', '" & Me.Step & "', '" &
      Me.Alfa & "', '" & Me.NForecast &   "', '" & Now () & "', '" & RMSE & "')"

      DoCmd.RunSQL sqlInsertar
      'Update the view of the form on screen
      Forms!frm_Forecasts!frm_His_Forecast.Form.Requery
      DoCmd.SetWarnings True 'Activate the messages in the system
      rta = MsgBox("Forecasting process ended correctly for: " & Servicio, vbOKOnly,
     "Forecastings...")
    Else
      MsgBox ("There is not enough data to do the forecasting with" & NReg & " Data")
    End If
    Rs.Close
End Sub
```

APPENDIX 3. VBA Script: Double Exponential Smoothing Method

```
Private Sub DoubleExpSmoothing()
    'Code to go over the data table doing double Smoothing exponential forecasting
    Dim Rs As DAO.Recordset
    Dim PeriodActual As Date
    Dim NError, Nr As Integer 'Variable that stores the number of errors equal to the total data to forecast and
    the record in process
    Dim NReg, Nr1, Nr2 As Integer 'Stores the number of records in process
    Dim Pro1, Pro2, PrTotal As Double 'Variables to accumulate the current forecast and the next forecast
    Dim Servicio, sqlInsertar As String 'Stores the IdService of the current record in process

    'Open the table to work with
    Set Rs = CurrentDb.OpenRecordset("Data_Forecast")
    'Calculate the number of records to process
    NReg = Rs.RecordCount
    Nr = 0
    Nr1 = 0
    Nr2 = 0
    'Code of the Service in current process
    Servicio = Rs!IdService.Value

   'Validates if there are enough data to do the forecast
    If NReg > 3 Then
        'If there are records to process this code goes over them
        Rs.MoveFirst
        'Take the value of Actual period
        PeriodActual = Rs!Period.Value
        'Goes over the table, processing the data
        Do While Not Rs.EOF
            If Nr < NReg / 2 Then
                Pro1 = Pro1 + Rs!BytesTotal.Value
                Nr1 = Nr1 + 1
            Else
                Pro2 = Pro2 + Rs!BytesTotal.Value
                Nr2 = Nr2 + 1
            End If
            Nr = Nr + 1

            'Take the value of Actual period
            PeriodActual = Rs!Period.Value
            'Jump to next record
            Rs.MoveNext
        Loop
        Nr = NReg / 2
        PrTotal = (Pro1 + Pro2) / NReg ' Total Average
        BN = ((Pro2 / Nr) - (Pro1 / Nr)) / Nr 'Difference between averages
        SN = PrTotal + BN * (Nr + 0.5)
```

```
        'Forecast of the asked periods K
        DoCmd.SetWarnings False 'Deactivated messages from the system
        For i = 1 To Forms!frm_Forecasts!NForecast
            PeriodActual = PeriodActual + IncPeriod(PeriodActual)
            Pro1 = SN + BN * i
            'Insert a record to store the forecast value
            sqlInsertar = "insert into Data_Forecast (Period,IdService, BytesPro) values ('" &
            PeriodActual & "', '" & Servicio & "', '" & Pro1 & "')"
            DoCmd.RunSQL sqlInsertar
        Next
        DoCmd.SetWarnings True 'Activate messages from the system
        rta = MsgBox("Forecasting process ended correctly for: " & Servicio, vbOKOnly,
        "Forecastings...")
    Else
        MsgBox ("There are not enough data to do the forecast with" & NReg & " data records.")
    End If
    Rs.Close
End Sub
```

APPENDIX 4. VBA Script: Least Square Method

```
Private Sub Do_Least_Squares_Click()
   'Code to go over the data table doing the least square method forecasting
   Dim Rs As DAO.Recordset 'Variable to operate with the records in the table
   Dim PeriodActual As Date
   Dim NReg, Per, NProAs As Integer 'Store the number of records in current process
   Dim Sx, Sy, Sxy, Sx2, a, b As Double 'Variables to calculate the model parameters
   Dim ProAnt, ProSig, VrRealAnt As Double 'Variables to accumulate the actual forecast and the next
   forecast
   Dim Servicio, sqlInsertar As String  'Stores the IdService of th record in current process  'Open the table to
   over its data
   Set Rs = CurrentDb.OpenRecordset("Data_Forecast")

   'Calculate the number of records to process
   NReg = Rs.RecordCount
   'Code of the service in process
   Servicio = Rs!IdService.Value
   'Validate if there are enough data to do the forecast
   If NReg > 1 Then
      'If there is record to process it goes over them
      Rs.MoveFirst

      'Start vaiables
      Sx = 0
      Sy = 0
      Sxy = 0
      Sx2 = 0
      Per = 1
      'it goes over the table processing the data
      Do While Not Rs.EOF
         'Calculate the necessary values to obtain the parameters a and b for the model
         Sx = Sx + Per
         Sy = Sy + Rs!BytesTotal.Value
         Sxy = Sxy + Per * Rs!BytesTotal.Value
         Sx2 = Sx2 + Per * Per
         Per = Per + 1 'Jump to the next period
         'Jumps to the next record
         Rs.MoveNext
      Loop

      'Calculates the parameters of the model
      b = (NReg * Sxy - Sx * Sy) / (NReg * Sx2 - Sx * Sx)
      a = (Sy - b * Sx) / NReg

      ' Locate the propmter in the first record
      Rs.MoveFirst
      Per = 1 'takes the first value
```

```
    'Initialize Inicializar variables para acumular el Root Mean Squares Error
    RMSE = 0 'Acumula el Root Mean Squares Error
    NPro = 0 'Acumula la cantidad de pronósticos realizados
    DoCmd.SetWarnings False 'Deactivate system messages
    'Se recorre la tabla procesando los datos
    Do While Not Rs.EOF
       Pro1 = a + b * Per
       'Incremento en periodo
       Per = Per + 1
       'Stores the data of the current period
       PeriodActual = Rs!Period.Value
       'Acumulo el Root Mean Squares Error
       RMSE = RMSE + (Rs!BytesTotal.Value - Pro1) ^ 2
       NPro = NPro + 1
       'Guardo el valor pronosticado
       Rs.Edit
       Rs!BytesPro.Value = Pro1
       Rs.Update
       'Se pasa al siguiente registro
       Rs.MoveNext
    Loop

    'Fijar el primer periodo a proyectar
     PeriodActual = PeriodActual + IncPeriod(PeriodActual)
    'Realizo proyección para los NForeCast peridos deseados
    For i = 1 To Forms!frm_Forecasts!NForecast
       Pro1 = a + b * Per
       'Inserto un registro para poner allí el valor pronosticado
       sqlInsertar = "insert into Data_Forecast (Period,IdService, BytesPro) values ('" &
       PeriodActual & "', '" & Servicio & "', '" & Pro1 & "')"
       DoCmd.RunSQL sqlInsertar
       'Paso al siguiente periodo
       PeriodActual = PeriodActual + IncPeriod(PeriodActual)
       Per = Per + 1
    Next
    'Se guardan los datos del pronóstico en His_Forecast
    sqlInsertar = "insert into Forecast (IdService, StartDate, FinalDate, Period, Model,
    Param_N, Param_Alfa, Param_F, FDate, RMSE) values ('" & Servicio & "', '" &
    Me.StarDate & "', '" & Me.FinalDate & "', '" & Me.go_Period & "', '" &
    Me.go_Forecasting _ & "', '" & Me.Step & "', '" & Me.Alfa & "', '" & Me.NForecast &
    "', '" & Now() & "', '" & RMSE & "')"
    DoCmd.RunSQL sqlInsertar
    'Se actualiza la vista del formulario histórico de pronósticos
    Forms!frm_Forecasts!frm_His_Forecast.Form.Requery
    DoCmd.SetWarnings True 'activar mensajes del sistema
    rta = MsgBox("Forecasting process ended correctly for: " & Servicio, vbOKOnly,
    "Forecastings...")
  Else
    MsgBox ("No hay datos suficientes para realizar la proyección con " & NReg & " Datos")
  End If
  Rs.Close
End Sub
```

APPENDIX 5. Netflix forecast by Day

Period	Real Bytes	Moving Av.	SES	DES	Least Square
01-kesä-15	3,9817E+12	0	0	0	3,9651E+12
02-kesä-15	3,5025E+12	0	3,9817E+12	0	3,9571E+12
03-kesä-15	3,5728E+12	0	3,9817E+12	0	3,9491E+12
04-kesä-15	3,0939E+12	0	3,7772E+12	0	3,941E+12
05-kesä-15	2,9764E+12	0	3,4356E+12	0	3,933E+12
06-kesä-15	3,5943E+12	0	3,206E+12	0	3,925E+12
07-kesä-15	4,4979E+12	0	3,4001E+12	0	3,917E+12
08-kesä-15	3,6449E+12	3,6028E+12	3,949E+12	0	3,909E+12
09-kesä-15	3,6264E+12	3,5547E+12	3,7969E+12	0	3,901E+12
10-kesä-15	3,5038E+12	3,5724E+12	3,7117E+12	0	3,8929E+12
11-kesä-15	3,3497E+12	3,5625E+12	3,6077E+12	0	3,8849E+12
12-kesä-15	3,4814E+12	3,599E+12	3,4787E+12	0	3,8769E+12
13-kesä-15	3,6229E+12	3,6712E+12	3,48E+12	0	3,8689E+12
14-kesä-15	5,4333E+12	3,6753E+12	3,5515E+12	0	3,8609E+12
15-kesä-15	4,1958E+12	3,8089E+12	4,4924E+12	0	3,8529E+12
16-kesä-15	4,273E+12	3,8876E+12	4,3441E+12	0	3,8449E+12
17-kesä-15	4,0447E+12	3,98E+12	4,3086E+12	0	3,8368E+12
18-kesä-15	3,8237E+12	4,0573E+12	4,1766E+12	0	3,8288E+12
19-kesä-15	2,7466E+12	4,125E+12	4,0002E+12	0	3,8208E+12
20-kesä-15	3,0037E+12	4,02E+12	3,3734E+12	0	3,8128E+12
21-kesä-15	4,7102E+12	3,9315E+12	3,1886E+12	0	3,8048E+12
22-kesä-15	4,9054E+12	3,8283E+12	3,9494E+12	0	3,7968E+12
23-kesä-15	4,1631E+12	3,9296E+12	4,4274E+12	0	3,7887E+12
24-kesä-15	4,9747E+12	3,9139E+12	4,2953E+12	0	3,7807E+12
25-kesä-15	4,0508E+12	4,0468E+12	4,635E+12	0	3,7727E+12
26-kesä-15	3,5599E+12	4,0792E+12	4,3429E+12	0	3,7647E+12
27-kesä-15	3,7855E+12	4,1954E+12	3,9514E+12	0	3,7567E+12
28-kesä-15	4,2002E+12	4,3071E+12	3,8685E+12	0	3,7487E+12
29-kesä-15	4,3065E+12	4,2342E+12	4,0343E+12	0	3,7406E+12
30-kesä-15	4,2877E+12	4,1487E+12	4,1704E+12	0	3,7326E+12
01-heinä-15	3,5752E+12	4,1665E+12	4,2291E+12	0	3,7246E+12
02-heinä-15	3,4578E+12	3,9665E+12	3,9021E+12	0	3,7166E+12
03-heinä-15	2,7223E+12	3,8818E+12	3,6799E+12	0	3,7086E+12
04-heinä-15	3,4826E+12	3,7622E+12	3,2011E+12	0	3,7006E+12
05-heinä-15	4,1651E+12	3,7189E+12	3,3419E+12	0	3,6925E+12
06-heinä-15	3,9482E+12	3,7139E+12	3,7535E+12	0	3,6845E+12
07-heinä-15	4,4857E+12	3,6627E+12	3,8508E+12	0	3,6765E+12
08-heinä-15	4,0321E+12	3,691E+12	4,1682E+12	0	3,6685E+12
09-heinä-15	3,8511E+12	3,7562E+12	4,1002E+12	0	3,6605E+12

10-heinä-15	3,7538E+12	3,8124E+12	3,9756E+12	0	3,6525E+12
11-heinä-15	3,388E+12	3,9598E+12	3,8647E+12	0	3,6444E+12
12-heinä-15	4,301E+12	3,9463E+12	3,6263E+12	0	3,6364E+12
13-heinä-15	3,6293E+12	3,9657E+12	3,9636E+12	0	3,6284E+12
14-heinä-15	3,7698E+12	3,9201E+12	3,7965E+12	0	3,6204E+12
15-heinä-15	3,6409E+12	3,8179E+12	3,7832E+12	0	3,6124E+12
16-heinä-15	3,2822E+12	3,762E+12	3,712E+12	0	3,6044E+12
17-heinä-15	2,7868E+12	3,6807E+12	3,4971E+12	0	3,5963E+12
18-heinä-15	3,147E+12	3,5426E+12	3,142E+12	0	3,5883E+12
19-heinä-15	3,6536E+12	3,5081E+12	3,1445E+12	0	3,5803E+12
20-heinä-15	3,3412E+12	3,4157E+12	3,399E+12	0	3,5723E+12
21-heinä-15	3,3544E+12	3,3745E+12	3,3701E+12	0	3,5643E+12
22-heinä-15	3,4314E+12	3,3152E+12	3,3623E+12	0	3,5563E+12
23-heinä-15	3,4146E+12	3,2852E+12	3,3968E+12	0	3,5482E+12
24-heinä-15	3,0167E+12	3,3041E+12	3,4057E+12	0	3,5402E+12
25-heinä-15	2,6029E+12	3,337E+12	3,2112E+12	0	3,5322E+12
26-heinä-15	4,8872E+12	3,2593E+12	2,9071E+12	0	3,5242E+12
27-heinä-15	4,019E+12	3,4355E+12	3,8971E+12	0	3,5162E+12
28-heinä-15	3,4625E+12	3,5323E+12	3,9581E+12	0	3,5082E+12
29-heinä-15	3,9276E+12	3,5478E+12	3,7103E+12	0	3,5001E+12
30-heinä-15	3,6114E+12	3,6186E+12	3,8189E+12	0	3,4921E+12
31-heinä-15	3,3011E+12	3,6467E+12	3,7152E+12	0	3,4841E+12
01-elo-15	3,4466E+12	3,6874E+12	3,5081E+12	0	3,4761E+12
02-elo-15	4,468E+12	3,8079E+12	3,4774E+12	0	3,4681E+12
03-elo-15	4,1968E+12	3,748E+12	3,9727E+12	0	3,4601E+12
04-elo-15	3,5943E+12	3,7734E+12	4,0848E+12	0	3,452E+12
05-elo-15	3,4837E+12	3,7923E+12	3,8395E+12	0	3,444E+12
06-elo-15	8156214	3,7289E+12	3,6616E+12	0	3,436E+12
07-elo-15	2,7313E+12	3,2129E+12	1,8308E+12	0	3,428E+12
08-elo-15	3,4885E+12	3,1315E+12	2,281E+12	0	3,42E+12
09-elo-15	4,3749E+12	3,1375E+12	2,8847E+12	0	3,412E+12
10-elo-15	4,1261E+12	3,1242E+12	3,6298E+12	0	3,4039E+12
11-elo-15	3,9788E+12	3,1141E+12	3,878E+12	0	3,3959E+12
12-elo-15	3,8281E+12	3,169E+12	3,9284E+12	0	3,3879E+12
13-elo-15	3,2231E+12	3,2182E+12	3,8782E+12	0	3,3799E+12
14-elo-15	2,9447E+12	3,6787E+12	3,5506E+12	0	3,3719E+12
15-elo-15	3,1884E+12	3,7092E+12	3,2477E+12	0	3,3639E+12
16-elo-15	3,9648E+12	3,6663E+12	3,2181E+12	0	3,3558E+12
17-elo-15	3,2919E+12	3,6077E+12	3,5914E+12	0	3,3478E+12
18-elo-15	3,1923E+12	3,4885E+12	3,4416E+12	0	3,3398E+12
19-elo-15	2,944E+12	3,3762E+12	3,317E+12	0	3,3318E+12
20-elo-15	3,0466E+12	3,2499E+12	3,1305E+12	0	3,3238E+12
21-elo-15	2,8668E+12	3,2247E+12	3,0886E+12	0	3,3158E+12

22-elo-15	2,8199E+12	3,2135E+12	2,9777E+12	0	3,3077E+12
23-elo-15	3,7734E+12	3,1609E+12	2,8988E+12	0	3,2997E+12
24-elo-15	3,0271E+12	3,1336E+12	3,3361E+12	0	3,2917E+12
25-elo-15	2,9101E+12	3,0957E+12	3,1816E+12	0	3,2837E+12
26-elo-15	3,2258E+12	3,0554E+12	3,0459E+12	0	3,2757E+12
27-elo-15	3,2563E+12	3,0957E+12	3,1358E+12	0	3,2677E+12
28-elo-15	3,0449E+12	3,1256E+12	3,1961E+12	0	3,2596E+12
29-elo-15	2,7154E+12	3,1511E+12	3,1205E+12	0	3,2516E+12
30-elo-15	4,2051E+12	3,1362E+12	2,918E+12	0	3,2436E+12
31-elo-15	3,5183E+12	3,1978E+12	3,5615E+12	0	3,2356E+12
01-syys-15		3,268E+12	3,5399E+12	3,1163E+12	3,2276E+12
02-syys-15		3,3191E+12	3,5507E+12	3,1061E+12	3,2196E+12
03-syys-15		3,3325E+12	3,5453E+12	3,0959E+12	3,2115E+12
04-syys-15		3,3433E+12	3,548E+12	3,0857E+12	3,2035E+12
05-syys-15		3,386E+12	3,5467E+12	3,0755E+12	3,1955E+12
06-syys-15		3,4818E+12	3,5473E+12	3,0653E+12	3,1875E+12
07-syys-15		3,3784E+12	3,547E+12	3,0551E+12	3,1795E+12
08-syys-15		3,3584E+12	3,5472E+12	3,0449E+12	3,1715E+12
09-syys-15		3,3714E+12	3,5471E+12	3,0347E+12	3,1634E+12
10-syys-15		3,3788E+12	3,5471E+12	3,0245E+12	3,1554E+12
11-syys-15		3,3854E+12	3,5471E+12	3,0143E+12	3,1474E+12
12-syys-15		3,3915E+12	3,5471E+12	3,0042E+12	3,1394E+12
13-syys-15		3,3922E+12	3,5471E+12	2,994E+12	3,1314E+12
14-syys-15		3,3795E+12	3,5471E+12	2,9838E+12	3,1234E+12
15-syys-15		3,3796E+12	3,5471E+12	2,9736E+12	3,1153E+12
16-syys-15		3,3826E+12	3,5471E+12	2,9634E+12	3,1073E+12
17-syys-15		3,3842E+12	3,5471E+12	2,9532E+12	3,0993E+12
18-syys-15		3,385E+12	3,5471E+12	2,943E+12	3,0913E+12
19-syys-15		3,3849E+12	3,5471E+12	2,9328E+12	3,0833E+12
20-syys-15		3,384E+12	3,5471E+12	2,9226E+12	3,0753E+12
21-syys-15		3,3828E+12	3,5471E+12	2,9124E+12	3,0672E+12
22-syys-15		3,3833E+12	3,5471E+12	2,9022E+12	3,0592E+12
23-syys-15		3,3839E+12	3,5471E+12	2,892E+12	3,0512E+12
24-syys-15		3,384E+12	3,5471E+12	2,8819E+12	3,0432E+12
25-syys-15		3,384E+12	3,5471E+12	2,8717E+12	3,0352E+12
26-syys-15		3,3839E+12	3,5471E+12	2,8615E+12	3,0272E+12
27-syys-15		3,3837E+12	3,5471E+12	2,8513E+12	3,0191E+12
28-syys-15		3,3837E+12	3,5471E+12	2,8411E+12	3,0111E+12
29-syys-15		3,3838E+12	3,5471E+12	2,8309E+12	3,0031E+12
30-syys-15		3,3838E+12	3,5471E+12	2,8207E+12	2,9951E+12

APPENDIX 6. Netflix Forecast by Week

Period	Real Bytes	Moving Av.	SES	DES	Least Square
06-kesä-15	2,0722E+13	0	0	0	2,6407E+13
13-kesä-15	2,5727E+13	0	2,0722E+13	0	2,6154E+13
20-kesä-15	2,7521E+13	0	2,0722E+13	0	2,59E+13
27-kesä-15	3,015E+13	2,4656E+13	2,4121E+13	0	2,5646E+13
04-heinä-15	2,6032E+13	2,7799E+13	2,7135E+13	0	2,5393E+13
11-heinä-15	2,7624E+13	2,7901E+13	2,6584E+13	0	2,5139E+13
18-heinä-15	2,4557E+13	2,7935E+13	2,7104E+13	0	2,4885E+13
25-heinä-15	2,2815E+13	2,6071E+13	2,583E+13	0	2,4632E+13
01-elo-15	2,6655E+13	2,4999E+13	2,4323E+13	0	2,4378E+13
08-elo-15	2,1963E+13	2,4676E+13	2,5489E+13	0	2,4124E+13
15-elo-15	2,5664E+13	2,3811E+13	2,3726E+13	0	2,3871E+13
22-elo-15	2,2126E+13	2,4761E+13	2,4695E+13	0	2,3617E+13
29-elo-15	2,1953E+13	2,3251E+13	2,3411E+13	0	2,3363E+13
05-syys-15		2,3248E+13	2,2682E+13	1,6311E+13	2,311E+13
12-syys-15		2,2442E+13	2,3046E+13	1,5168E+13	2,2856E+13
19-syys-15		2,2548E+13	2,2864E+13	1,4025E+13	2,2602E+13
26-syys-15		2,2746E+13	2,2955E+13	1,2881E+13	2,2349E+13

APPENDIX 7. Netflix Forecast by Month

Period	Real Bytes	Moving Av.	Least Square
30-kesä-15	1,1691E+14	0	1,17429E+14
31-heinä-15	1,1144E+14	0	1,10411E+14
31-elo-15	1,0288E+14	1,1418E+14	1,03392E+14
30-syys-15		1,0716E+14	9,63732E+13
31-loka-15		1,0502E+14	8,93545E+13
30-marras-15		1,0609E+14	8,23358E+13

APPENDIX 8. YouTube forecast by day

Period	BytesTotal	Moving av.	SES	DES	Least Square
01-kesä-15	4,2154E+12	0	0	0	3,88896E+12
02-kesä-15	3,8679E+12	0	4,2154E+12	0	3,89538E+12
03-kesä-15	3,8591E+12	0	4,2154E+12	0	3,9018E+12
04-kesä-15	3,846E+12	0	4,0373E+12	0	3,90822E+12
05-kesä-15	3,7444E+12	0	3,9416E+12	0	3,91463E+12
06-kesä-15	4,023E+12	0	3,843E+12	0	3,92105E+12
07-kesä-15	4,2698E+12	0	3,933E+12	0	3,92747E+12
08-kesä-15	3,9526E+12	3,9751E+12	4,1014E+12	0	3,93389E+12
09-kesä-15	3,8927E+12	3,9375E+12	4,027E+12	0	3,9403E+12
10-kesä-15	3,9657E+12	3,9411E+12	3,9598E+12	0	3,94672E+12
11-kesä-15	3,8298E+12	3,9563E+12	3,9628E+12	0	3,95314E+12
12-kesä-15	3,7526E+12	3,954E+12	3,8963E+12	0	3,95956E+12
13-kesä-15	3,6583E+12	3,9551E+12	3,8244E+12	0	3,96597E+12
14-kesä-15	4,2577E+12	3,9031E+12	3,7414E+12	0	3,97239E+12
15-kesä-15	3,9897E+12	3,9013E+12	3,9995E+12	0	3,97881E+12
16-kesä-15	4,1713E+12	3,9066E+12	3,9946E+12	0	3,98523E+12
17-kesä-15	3,8044E+12	3,9464E+12	4,083E+12	0	3,99164E+12
18-kesä-15	3,9511E+12	3,9234E+12	3,9437E+12	0	3,99806E+12
19-kesä-15	3,2041E+12	3,9407E+12	3,9474E+12	0	4,00448E+12
20-kesä-15	2,9458E+12	3,8624E+12	3,5757E+12	0	4,0109E+12
21-kesä-15	3,7681E+12	3,7606E+12	3,2607E+12	0	4,01731E+12
22-kesä-15	4,4368E+12	3,6906E+12	3,5144E+12	0	4,02373E+12
23-kesä-15	3,9891E+12	3,7545E+12	3,9756E+12	0	4,03015E+12
24-kesä-15	4,4918E+12	3,7285E+12	3,9823E+12	0	4,03657E+12
25-kesä-15	3,9185E+12	3,8267E+12	4,2371E+12	0	4,04298E+12
26-kesä-15	3,7655E+12	3,822E+12	4,0778E+12	0	4,0494E+12
27-kesä-15	3,8419E+12	3,9022E+12	3,9216E+12	0	4,05582E+12
28-kesä-15	3,6933E+12	4,0302E+12	3,8818E+12	0	4,06224E+12
29-kesä-15	4,2616E+12	4,0196E+12	3,7875E+12	0	4,06865E+12
30-kesä-15	4,3612E+12	3,9945E+12	4,0246E+12	0	4,07507E+12
01-heinä-15	4,1214E+12	4,0477E+12	4,1929E+12	0	4,08149E+12
02-heinä-15	4,0041E+12	3,9948E+12	4,1571E+12	0	4,08791E+12
03-heinä-15	3,7955E+12	4,007E+12	4,0806E+12	0	4,09432E+12
04-heinä-15	3,9173E+12	4,0113E+12	3,9381E+12	0	4,10074E+12
05-heinä-15	4,0315E+12	4,022E+12	3,9277E+12	0	4,10716E+12
06-heinä-15	4,1643E+12	4,0704E+12	3,9796E+12	0	4,11358E+12
07-heinä-15	4,4895E+12	4,0565E+12	4,0719E+12	0	4,11999E+12
08-heinä-15	4,3978E+12	4,0748E+12	4,2807E+12	0	4,12641E+12
09-heinä-15	4,5501E+12	4,1143E+12	4,3393E+12	0	4,13283E+12
10-heinä-15	4,512E+12	4,1923E+12	4,4447E+12	0	4,13925E+12

11-heinä-15	4,0804E+12	4,2946E+12	4,4783E+12	0	4,14566E+12
12-heinä-15	4,4199E+12	4,318E+12	4,2794E+12	0	4,15208E+12
13-heinä-15	4,3451E+12	4,3734E+12	4,3497E+12	0	4,1585E+12
14-heinä-15	4,136E+12	4,3993E+12	4,3474E+12	0	4,16492E+12
15-heinä-15	4,3062E+12	4,3488E+12	4,2417E+12	0	4,17133E+12
16-heinä-15	4,1506E+12	4,3357E+12	4,2739E+12	0	4,17775E+12
17-heinä-15	3,9541E+12	4,2786E+12	4,2122E+12	0	4,18417E+12
18-heinä-15	4,1638E+12	4,1989E+12	4,0832E+12	0	4,19059E+12
19-heinä-15	4,4752E+12	4,2108E+12	4,1235E+12	0	4,197E+12
20-heinä-15	4,3248E+12	4,2187E+12	4,2993E+12	0	4,20342E+12
21-heinä-15	4,319E+12	4,2158E+12	4,3121E+12	0	4,20984E+12
22-heinä-15	4,6756E+12	4,2419E+12	4,3155E+12	0	4,21626E+12
23-heinä-15	4,6526E+12	4,2947E+12	4,4956E+12	0	4,22267E+12
24-heinä-15	4,3136E+12	4,3664E+12	4,5741E+12	0	4,22909E+12
25-heinä-15	3,82E+12	4,4178E+12	4,4438E+12	0	4,23551E+12
26-heinä-15	5,0029E+12	4,3687E+12	4,1319E+12	0	4,24193E+12
27-heinä-15	4,9587E+12	4,4441E+12	4,5674E+12	0	4,24834E+12
28-heinä-15	4,2882E+12	4,5346E+12	4,7631E+12	0	4,25476E+12
29-heinä-15	4,5476E+12	4,5302E+12	4,5257E+12	0	4,26118E+12
30-heinä-15	4,4201E+12	4,512E+12	4,5366E+12	0	4,2676E+12
31-heinä-15	4,4467E+12	4,4787E+12	4,4783E+12	0	4,27401E+12
01-elo-15	4,2223E+12	4,4978E+12	4,4625E+12	0	4,28043E+12
02-elo-15	4,5338E+12	4,5552E+12	4,3424E+12	0	4,28685E+12
03-elo-15	4,7249E+12	4,4882E+12	4,4381E+12	0	4,29327E+12
04-elo-15	4,4471E+12	4,4548E+12	4,5815E+12	0	4,29968E+12
05-elo-15	4,386E+12	4,4775E+12	4,5143E+12	0	4,3061E+12
06-elo-15	2036208450	4,4544E+12	4,4501E+12	0	4,31252E+12
07-elo-15	3,3786E+12	3,8233E+12	2,2261E+12	0	4,31894E+12
08-elo-15	4,703E+12	3,6707E+12	2,8024E+12	0	4,32535E+12
09-elo-15	5,1638E+12	3,7393E+12	3,7527E+12	0	4,33177E+12
10-elo-15	5,1494E+12	3,8293E+12	4,4582E+12	0	4,33819E+12
11-elo-15	4,6931E+12	3,89E+12	4,8038E+12	0	4,34461E+12
12-elo-15	4,5886E+12	3,9251E+12	4,7484E+12	0	4,35102E+12
13-elo-15	4,4517E+12	3,9541E+12	4,6685E+12	0	4,35744E+12
14-elo-15	4,2615E+12	4,5897E+12	4,5601E+12	0	4,36386E+12
15-elo-15	4,9182E+12	4,7159E+12	4,4108E+12	0	4,37028E+12
16-elo-15	4,9893E+12	4,7466E+12	4,6645E+12	0	4,37669E+12
17-elo-15	4,1053E+12	4,7217E+12	4,8269E+12	0	4,38311E+12
18-elo-15	4,0133E+12	4,5725E+12	4,4661E+12	0	4,38953E+12
19-elo-15	4,0299E+12	4,4754E+12	4,2397E+12	0	4,39595E+12
20-elo-15	4,1533E+12	4,3956E+12	4,1348E+12	0	4,40236E+12
21-elo-15	4,216E+12	4,353E+12	4,1441E+12	0	4,40878E+12
22-elo-15	4,6981E+12	4,3465E+12	4,18E+12	0	4,4152E+12

23-elo-15	4,8817E+12	4,315E+12	4,4391E+12	0	4,42162E+12
24-elo-15	4,0246E+12	4,2996E+12	4,6604E+12	0	4,42803E+12
25-elo-15	4,0391E+12	4,2881E+12	4,3425E+12	0	4,43445E+12
26-elo-15	4,319E+12	4,2918E+12	4,1908E+12	0	4,44087E+12
27-elo-15	4,351E+12	4,3331E+12	4,2549E+12	0	4,44729E+12
28-elo-15	4,3526E+12	4,3613E+12	4,303E+12	0	4,4537E+12
29-elo-15	4,1718E+12	4,3809E+12	4,3278E+12	0	4,46012E+12
30-elo-15	4,832E+12	4,3057E+12	4,2498E+12	0	4,46654E+12
31-elo-15	4,3339E+12	4,2986E+12	4,5409E+12	0	4,47296E+12
01-syys-15		4,3428E+12	4,4374E+12	4,503E+12	4,47937E+12
02-syys-15		4,3862E+12	4,4891E+12	4,5098E+12	4,48579E+12
03-syys-15		4,3958E+12	4,4633E+12	4,5166E+12	4,49221E+12
04-syys-15		4,4021E+12	4,4762E+12	4,5234E+12	4,49863E+12
05-syys-15		4,4092E+12	4,4697E+12	4,5301E+12	4,50504E+12
06-syys-15		4,4431E+12	4,473E+12	4,5369E+12	4,51146E+12
07-syys-15		4,3876E+12	4,4714E+12	4,5437E+12	4,51788E+12
08-syys-15		4,3953E+12	4,4722E+12	4,5505E+12	4,5243E+12
09-syys-15		4,4027E+12	4,4718E+12	4,5573E+12	4,53071E+12
10-syys-15		4,4051E+12	4,472E+12	4,564E+12	4,53713E+12
11-syys-15		4,4065E+12	4,4719E+12	4,5708E+12	4,54355E+12
12-syys-15		4,4071E+12	4,4719E+12	4,5776E+12	4,54997E+12
13-syys-15		4,4068E+12	4,4719E+12	4,5844E+12	4,55638E+12
14-syys-15		4,4016E+12	4,4719E+12	4,5912E+12	4,5628E+12
15-syys-15		4,4036E+12	4,4719E+12	4,5979E+12	4,56922E+12
16-syys-15		4,4048E+12	4,4719E+12	4,6047E+12	4,57564E+12
17-syys-15		4,405E+12	4,4719E+12	4,6115E+12	4,58205E+12
18-syys-15		4,405E+12	4,4719E+12	4,6183E+12	4,58847E+12
19-syys-15		4,4048E+12	4,4719E+12	4,6251E+12	4,59489E+12
20-syys-15		4,4045E+12	4,4719E+12	4,6318E+12	4,60131E+12
21-syys-15		4,4042E+12	4,4719E+12	4,6386E+12	4,60772E+12
22-syys-15		4,4046E+12	4,4719E+12	4,6454E+12	4,61414E+12
23-syys-15		4,4047E+12	4,4719E+12	4,6522E+12	4,62056E+12
24-syys-15		4,4047E+12	4,4719E+12	4,659E+12	4,62698E+12
25-syys-15		4,4046E+12	4,4719E+12	4,6658E+12	4,63339E+12
26-syys-15		4,4046E+12	4,4719E+12	4,6725E+12	4,63981E+12
27-syys-15		4,4046E+12	4,4719E+12	4,6793E+12	4,64623E+12
28-syys-15		4,4046E+12	4,4719E+12	4,6861E+12	4,65265E+12
29-syys-15		4,4046E+12	4,4719E+12	4,6929E+12	4,65906E+12
30-syys-15		4,4046E+12	4,4719E+12	4,6997E+12	4,66548E+12

APPENDIX 9. Youtube forecast by Week

Period	BytesTotal	Moving Av.	SES	DES	Least Squares
06-kesä-15	2,3556E+13	0	0	0	2,6139E+13
13-kesä-15	2,7321E+13	0	2,3556E+13	0	2,65964E+13
20-kesä-15	2,6324E+13	0	2,3556E+13	0	2,70537E+13
27-kesä-15	2,8212E+13	2,5734E+13	2,494E+13	0	2,75111E+13
04-heinä-15	2,8154E+13	2,7286E+13	2,6576E+13	0	2,79685E+13
11-heinä-15	3,0226E+13	2,7563E+13	2,7365E+13	0	2,84259E+13
14-heinä-15	2,9476E+13	2,8864E+13	2,8795E+13	0	2,88833E+13
25-heinä-15	3,0581E+13	2,9285E+13	2,9135E+13	0	2,93406E+13
01-elo-15	3,1887E+13	3,0094E+13	2,9858E+13	0	2,9798E+13
08-elo-15	2,6175E+13	3,0648E+13	3,0872E+13	0	3,02554E+13
15-elo-15	3,3226E+13	2,9548E+13	2,8524E+13	0	3,07128E+13
22-elo-15	3,0205E+13	3,0429E+13	3,0875E+13	0	3,11702E+13
29-elo-15	3,014E+13	2,9869E+13	3,054E+13	0	3,16276E+13
05-syys-15		3,119E+13	3,034E+13	2,658E+13	3,20849E+13
12-syys-15		3,0512E+13	3,044E+13	2,6273E+13	3,25423E+13
19-syys-15		3,0614E+13	3,039E+13	2,5966E+13	3,29997E+13
26-syys-15		3,0772E+13	3,0415E+13	2,5659E+13	3,34571E+13

APPENDIX 10. Youtube Forecast by Month

Period	Real bytes	Moving av.	Least Square
30-kesä-15	1,1773E+14	0	1,2051E+14
31-heinä-15	1,3378E+14	0	1,2822E+14
31-elo-15	1,3313E+14	1,2576E+14	1,3592E+14
30-syys-15		1,3346E+14	1,4362E+14
31-loka-15		1,333E+14	1,5132E+14
30-marras-15		1,3338E+14	1,5903E+14

APPENDIX 11. HTTP Media Stream forecast by Day

Period	Real Bytes	Moving Av	SES	DES	Least Square
01-kesä-15	3,2828E+12	0	0	0	2,5174E+12
02-kesä-15	3,1924E+12	0	3,2828E+12	0	2,5087E+12
03-kesä-15	3,2422E+12	0	3,2828E+12	0	2,5E+12
04-kesä-15	3,1192E+12	0	3,2625E+12	0	2,4912E+12
05-kesä-15	2,7626E+12	0	3,1909E+12	0	2,4825E+12
06-kesä-15	3,3944E+12	0	2,9767E+12	0	2,4738E+12
07-kesä-15	3,8829E+12	0	3,1856E+12	0	2,4651E+12
08-kesä-15	3,6712E+12	3,2681E+12	3,5343E+12	0	2,4564E+12
09-kesä-15	3,2413E+12	3,3236E+12	3,6027E+12	0	2,4477E+12
10-kesä-15	2,3992E+12	3,3306E+12	3,422E+12	0	2,439E+12
11-kesä-15	2,035E+12	3,2101E+12	2,9106E+12	0	2,4302E+12
12-kesä-15	1,8045E+12	3,0552E+12	2,4728E+12	0	2,4215E+12
13-kesä-15	2,4575E+12	2,9184E+12	2,1386E+12	0	2,4128E+12
14-kesä-15	2,7706E+12	2,7845E+12	2,2981E+12	0	2,4041E+12
15-kesä-15	2,4951E+12	2,6256E+12	2,5343E+12	0	2,3954E+12
16-kesä-15	2,327E+12	2,4576E+12	2,5147E+12	0	2,3867E+12
17-kesä-15	2,0122E+12	2,327E+12	2,4208E+12	0	2,378E+12
18-kesä-15	1,9217E+12	2,2717E+12	2,2165E+12	0	2,3692E+12
19-kesä-15	1,5684E+12	2,2555E+12	2,0691E+12	0	2,3605E+12
20-kesä-15	1,642E+12	2,2218E+12	1,8187E+12	0	2,3518E+12
21-kesä-15	2,151E+12	2,1053E+12	1,7304E+12	0	2,3431E+12
22-kesä-15	2,6018E+12	2,0168E+12	1,9407E+12	0	2,3344E+12
23-kesä-15	2,0281E+12	2,032E+12	2,2712E+12	0	2,3257E+12
24-kesä-15	2,326E+12	1,9893E+12	2,1497E+12	0	2,317E+12
25-kesä-15	1,9459E+12	2,0341E+12	2,2378E+12	0	2,3083E+12
26-kesä-15	1,8946E+12	2,0376E+12	2,0919E+12	0	2,2995E+12
27-kesä-15	2,1207E+12	2,0842E+12	1,9932E+12	0	2,2908E+12
28-kesä-15	2,1312E+12	2,1526E+12	2,057E+12	0	2,2821E+12
29-kesä-15	2,0725E+12	2,1498E+12	2,0941E+12	0	2,2734E+12
30-kesä-15	1,9002E+12	2,0741E+12	2,0833E+12	0	2,2647E+12
01-heinä-15	1,7104E+12	2,0559E+12	1,9918E+12	0	2,256E+12
02-heinä-15	1,6466E+12	1,9679E+12	1,8511E+12	0	2,2473E+12
03-heinä-15	1,5599E+12	1,9252E+12	1,7488E+12	0	2,2385E+12
04-heinä-15	1,8227E+12	1,8774E+12	1,6544E+12	0	2,2298E+12
05-heinä-15	2,1183E+12	1,8348E+12	1,7385E+12	0	2,2211E+12
06-heinä-15	2,0664E+12	1,833E+12	1,9284E+12	0	2,2124E+12
07-heinä-15	2,097E+12	1,8321E+12	1,9974E+12	0	2,2037E+12
08-heinä-15	1,9914E+12	1,8602E+12	2,0472E+12	0	2,195E+12
09-heinä-15	2,0296E+12	1,9003E+12	2,0193E+12	0	2,1863E+12

10-heinä-15	1,8537E+12	1,955E+12	2,0245E+12	0	2,1775E+12
11-heinä-15	1,6703E+12	1,997E+12	1,9391E+12	0	2,1688E+12
12-heinä-15	2,0621E+12	1,9752E+12	1,8047E+12	0	2,1601E+12
13-heinä-15	1,9114E+12	1,9672E+12	1,9334E+12	0	2,1514E+12
14-heinä-15	2,0048E+12	1,9451E+12	1,9224E+12	0	2,1427E+12
15-heinä-15	1,9195E+12	1,9319E+12	1,9636E+12	0	2,134E+12
16-heinä-15	1,8343E+12	1,9216E+12	1,9415E+12	0	2,1253E+12
17-heinä-15	1,6913E+12	1,8937E+12	1,8879E+12	0	2,1166E+12
18-heinä-15	1,9895E+12	1,8705E+12	1,7896E+12	0	2,1078E+12
19-heinä-15	2,238E+12	1,9161E+12	1,8896E+12	0	2,0991E+12
20-heinä-15	1,994E+12	1,9412E+12	2,0638E+12	0	2,0904E+12
21-heinä-15	1,9487E+12	1,9531E+12	2,0289E+12	0	2,0817E+12
22-heinä-15	1,952E+12	1,945E+12	1,9888E+12	0	2,073E+12
23-heinä-15	1,9987E+12	1,9497E+12	1,9704E+12	0	2,0643E+12
24-heinä-15	1,7414E+12	1,9732E+12	1,9845E+12	0	2,0556E+12
25-heinä-15	1,7128E+12	1,9803E+12	1,8629E+12	0	2,0468E+12
26-heinä-15	2,6855E+12	1,9408E+12	1,7879E+12	0	2,0381E+12
27-heinä-15	2,2011E+12	2,0047E+12	2,2367E+12	0	2,0294E+12
28-heinä-15	1,9284E+12	2,0343E+12	2,2189E+12	0	2,0207E+12
29-heinä-15	2,02E+12	2,0314E+12	2,0737E+12	0	2,012E+12
30-heinä-15	2,0956E+12	2,0411E+12	2,0468E+12	0	2,0033E+12
31-heinä-15	1,8995E+12	2,055E+12	2,0712E+12	0	1,9946E+12
01-elo-15	1,9948E+12	2,0776E+12	1,9854E+12	0	1,9858E+12
02-elo-15	2,2397E+12	2,1178E+12	1,9901E+12	0	1,9771E+12
03-elo-15	2,0977E+12	2,0541E+12	2,1149E+12	0	1,9684E+12
04-elo-15	1,8048E+12	2,0394E+12	2,1063E+12	0	1,9597E+12
05-elo-15	1,7147E+12	2,0217E+12	1,9555E+12	0	1,951E+12
06-elo-15	9,2818E+10	1,9781E+12	1,8351E+12	0	1,9423E+12
07-elo-15	1,6836E+12	1,692E+12	9,6397E+11	0	1,9336E+12
08-elo-15	1,8811E+12	1,6611E+12	1,3238E+12	0	1,9248E+12
09-elo-15	2,154E+12	1,6449E+12	1,6024E+12	0	1,9161E+12
10-elo-15	2,0931E+12	1,6327E+12	1,8782E+12	0	1,9074E+12
11-elo-15	1,982E+12	1,632E+12	1,9856E+12	0	1,8987E+12
12-elo-15	2,1297E+12	1,6573E+12	1,9838E+12	0	1,89E+12
13-elo-15	1,9106E+12	1,7166E+12	2,0567E+12	0	1,8813E+12
14-elo-15	1,7858E+12	1,9763E+12	1,9837E+12	0	1,8726E+12
15-elo-15	1,8723E+12	1,9909E+12	1,8847E+12	0	1,8639E+12
16-elo-15	2,3917E+12	1,9896E+12	1,8785E+12	0	1,8551E+12
17-elo-15	2,0518E+12	2,0236E+12	2,1351E+12	0	1,8464E+12
18-elo-15	1,8588E+12	2,0177E+12	2,0934E+12	0	1,8377E+12
19-elo-15	1,7443E+12	2,0001E+12	1,9761E+12	0	1,829E+12
20-elo-15	1,8393E+12	1,945E+12	1,8602E+12	0	1,8203E+12
21-elo-15	1,7861E+12	1,9349E+12	1,8498E+12	0	1,8116E+12

22-elo-15	1,9432E+12	1,9349E+12	1,8179E+12	0	1,8029E+12
23-elo-15	2,6663E+12	1,945E+12	1,8805E+12	0	1,7941E+12
24-elo-15	2,2908E+12	1,9842E+12	2,2734E+12	0	1,7854E+12
25-elo-15	2,0328E+12	2,0184E+12	2,2821E+12	0	1,7767E+12
26-elo-15	2,2201E+12	2,0433E+12	2,1574E+12	0	1,768E+12
27-elo-15	2,0377E+12	2,1112E+12	2,1888E+12	0	1,7593E+12
28-elo-15	1,8736E+12	2,1396E+12	2,1132E+12	0	1,7506E+12
29-elo-15	1,858E+12	2,1521E+12	1,9934E+12	0	1,7419E+12
30-elo-15	2,3494E+12	2,1399E+12	1,9257E+12	0	1,7331E+12
31-elo-15	1,9543E+12	2,0946E+12	2,1376E+12	0	1,7244E+12
01-syys-15		2,0465E+12	2,0459E+12	1,8008E+12	1,7157E+12
02-syys-15		2,0485E+12	2,0917E+12	1,794E+12	1,707E+12
03-syys-15		2,024E+12	2,0688E+12	1,7873E+12	1,6983E+12
04-syys-15		2,0221E+12	2,0803E+12	1,7805E+12	1,6896E+12
05-syys-15		2,0433E+12	2,0745E+12	1,7738E+12	1,6809E+12
06-syys-15		2,0697E+12	2,0774E+12	1,7671E+12	1,6722E+12
07-syys-15		2,0298E+12	2,076E+12	1,7603E+12	1,6634E+12
08-syys-15		2,0406E+12	2,0767E+12	1,7536E+12	1,6547E+12
09-syys-15		2,0397E+12	2,0763E+12	1,7468E+12	1,646E+12
10-syys-15		2,0384E+12	2,0765E+12	1,7401E+12	1,6373E+12
11-syys-15		2,0405E+12	2,0764E+12	1,7334E+12	1,6286E+12
12-syys-15		2,0431E+12	2,0765E+12	1,7266E+12	1,6199E+12
13-syys-15		2,0431E+12	2,0765E+12	1,7199E+12	1,6112E+12
14-syys-15		2,0393E+12	2,0765E+12	1,7131E+12	1,6024E+12
15-syys-15		2,0407E+12	2,0765E+12	1,7064E+12	1,5937E+12
16-syys-15		2,0407E+12	2,0765E+12	1,6997E+12	1,585E+12
17-syys-15		2,0408E+12	2,0765E+12	1,6929E+12	1,5763E+12
18-syys-15		2,0412E+12	2,0765E+12	1,6862E+12	1,5676E+12
19-syys-15		2,0413E+12	2,0765E+12	1,6794E+12	1,5589E+12
20-syys-15		2,041E+12	2,0765E+12	1,6727E+12	1,5502E+12
21-syys-15		2,0407E+12	2,0765E+12	1,666E+12	1,5414E+12
22-syys-15		2,0409E+12	2,0765E+12	1,6592E+12	1,5327E+12
23-syys-15		2,0409E+12	2,0765E+12	1,6525E+12	1,524E+12
24-syys-15		2,041E+12	2,0765E+12	1,6457E+12	1,5153E+12
25-syys-15		2,041E+12	2,0765E+12	1,639E+12	1,5066E+12
26-syys-15		2,041E+12	2,0765E+12	1,6323E+12	1,4979E+12
27-syys-15		2,0409E+12	2,0765E+12	1,6255E+12	1,4892E+12
28-syys-15		2,0409E+12	2,0765E+12	1,6188E+12	1,4804E+12
29-syys-15		2,041E+12	2,0765E+12	1,612E+12	1,4717E+12
30-syys-15		2,041E+12	2,0765E+12	1,6053E+12	1,463E+12

APPENDIX 12. HTTP Media Stream Forecast by Week

Period	Real bytes	Moving Av.	SES	BytesPro	BytesPro
06-kesä-15	1,8994E+13	0	0	0	1,6777E+13
13-kesä-15	1,9492E+13	0	1,8994E+13	0	1,6427E+13
20-kesä-15	1,4737E+13	0	1,8994E+13	0	1,6077E+13
27-kesä-15	1,5068E+13	1,7741E+13	1,6865E+13	0	1,5728E+13
04-heinä-15	1,2844E+13	1,6432E+13	1,5967E+13	0	1,5378E+13
11-heinä-15	1,3827E+13	1,4216E+13	1,4405E+13	0	1,5028E+13
18-heinä-15	1,3413E+13	1,3913E+13	1,4116E+13	0	1,4678E+13
20-heinä-15	1,3586E+13	1,3361E+13	1,3764E+13	0	1,4329E+13
01-elo-15	1,4825E+13	1,3608E+13	1,3675E+13	0	1,3979E+13
08-elo-15	1,1514E+13	1,3941E+13	1,425E+13	0	1,3629E+13
15-elo-15	1,3927E+13	1,3308E+13	1,2882E+13	0	1,328E+13
22-elo-15	1,3615E+13	1,3422E+13	1,3405E+13	0	1,293E+13
29-elo-15	1,4979E+13	1,3019E+13	1,351E+13	0	1,258E+13
05-syys-15		1,4174E+13	1,4245E+13	9,277E+12	1,2231E+13
12-syys-15		1,4256E+13	1,3877E+13	8,5568E+12	1,1881E+13
19-syys-15		1,447E+13	1,4061E+13	7,8366E+12	1,1531E+13
26-syys-15		1,43E+13	1,3969E+13	7,1165E+12	1,1181E+13

APPENDIX 13. HTTP Media Stream forecast by Month

Period	Real Bytes	Moving Av	Least Square
30-kesä-15	7,4394E+13	0	7,2071E+13
31-heinä-15	6,0395E+13	0	6,50412E+13
31-elo-15	6,0335E+13	6,7394E+13	5,80114E+13
30-syys-15		6,0365E+13	5,09815E+13
31-loka-15		6,035E+13	4,39517E+13
30-marras-15		6,0357E+13	3,69219E+13

APPENDIX 14. Twitch Forecast by Day

Period	Real bytes	Moving av.	SES	DES	Least Square
01-kesä-15	1,5792E+12	0	0	0	1,3838E+12
02-kesä-15	1,4937E+12	0	1,5792E+12	0	1,3878E+12
03-kesä-15	1,3662E+12	0	1,5792E+12	0	1,3917E+12
04-kesä-15	1,3323E+12	0	1,4727E+12	0	1,3957E+12
05-kesä-15	1,3198E+12	0	1,4025E+12	0	1,3997E+12
06-kesä-15	1,6682E+12	0	1,3611E+12	0	1,4037E+12
07-kesä-15	1,7498E+12	0	1,5147E+12	0	1,4077E+12
08-kesä-15	1,3599E+12	1,5013E+12	1,6323E+12	0	1,4116E+12
09-kesä-15	1,3793E+12	1,47E+12	1,4961E+12	0	1,4156E+12
10-kesä-15	1,2825E+12	1,4536E+12	1,4377E+12	0	1,4196E+12
11-kesä-15	1,207E+12	1,4417E+12	1,3601E+12	0	1,4236E+12
12-kesä-15	1,2499E+12	1,4238E+12	1,2835E+12	0	1,4275E+12
13-kesä-15	1,652E+12	1,4138E+12	1,2667E+12	0	1,4315E+12
14-kesä-15	2,054E+12	1,4115E+12	1,4594E+12	0	1,4355E+12
15-kesä-15	2,1006E+12	1,4549E+12	1,7567E+12	0	1,4395E+12
16-kesä-15	1,5219E+12	1,5608E+12	1,9286E+12	0	1,4435E+12
17-kesä-15	1,4068E+12	1,5811E+12	1,7252E+12	0	1,4474E+12
18-kesä-15	1,2721E+12	1,5989E+12	1,566E+12	0	1,4514E+12
19-kesä-15	1,0789E+12	1,6082E+12	1,4191E+12	0	1,4554E+12
20-kesä-15	1,1215E+12	1,5838E+12	1,249E+12	0	1,4594E+12
21-kesä-15	1,5888E+12	1,508E+12	1,1853E+12	0	1,4634E+12
22-kesä-15	1,2626E+12	1,4415E+12	1,387E+12	0	1,4673E+12
23-kesä-15	1,3694E+12	1,3218E+12	1,3248E+12	0	1,4713E+12
24-kesä-15	1,3412E+12	1,3E+12	1,3471E+12	0	1,4753E+12
25-kesä-15	1,3124E+12	1,2907E+12	1,3442E+12	0	1,4793E+12
26-kesä-15	1,331E+12	1,2964E+12	1,3283E+12	0	1,4833E+12
27-kesä-15	1,6175E+12	1,3324E+12	1,3296E+12	0	1,4872E+12
28-kesä-15	1,9566E+12	1,4033E+12	1,4736E+12	0	1,4912E+12
29-kesä-15	1,4524E+12	1,4558E+12	1,7151E+12	0	1,4952E+12
30-kesä-15	1,4715E+12	1,4829E+12	1,5837E+12	0	1,4992E+12
01-heinä-15	1,3893E+12	1,4975E+12	1,5276E+12	0	1,5031E+12
02-heinä-15	1,8134E+12	1,5044E+12	1,4585E+12	0	1,5071E+12
03-heinä-15	1,2805E+12	1,5759E+12	1,6359E+12	0	1,5111E+12
04-heinä-15	1,4925E+12	1,5687E+12	1,4582E+12	0	1,5151E+12
05-heinä-15	1,9112E+12	1,5509E+12	1,4753E+12	0	1,5191E+12
06-heinä-15	1,2897E+12	1,5444E+12	1,6933E+12	0	1,523E+12
07-heinä-15	1,301E+12	1,5212E+12	1,4915E+12	0	1,527E+12
08-heinä-15	1,3155E+12	1,4968E+12	1,3962E+12	0	1,531E+12
09-heinä-15	1,2202E+12	1,4862E+12	1,3559E+12	0	1,535E+12

10-heinä-15	1,443E+12	1,4015E+12	1,288E+12	0	1,539E+12
11-heinä-15	1,7311E+12	1,4247E+12	1,3655E+12	0	1,5429E+12
12-heinä-15	1,7484E+12	1,4588E+12	1,5483E+12	0	1,5469E+12
13-heinä-15	1,3493E+12	1,4356E+12	1,6484E+12	0	1,5509E+12
14-heinä-15	1,217E+12	1,4441E+12	1,4988E+12	0	1,5549E+12
15-heinä-15	1,182E+12	1,4321E+12	1,3579E+12	0	1,5588E+12
16-heinä-15	1,4028E+12	1,413E+12	1,27E+12	0	1,5628E+12
17-heinä-15	1,7241E+12	1,4391E+12	1,3364E+12	0	1,5668E+12
18-heinä-15	1,8888E+12	1,4793E+12	1,5303E+12	0	1,5708E+12
19-heinä-15	1,4025E+12	1,5018E+12	1,7095E+12	0	1,5748E+12
20-heinä-15	1,2633E+12	1,4524E+12	1,556E+12	0	1,5787E+12
21-heinä-15	1,2697E+12	1,4401E+12	1,4097E+12	0	1,5827E+12
22-heinä-15	1,2157E+12	1,4476E+12	1,3397E+12	0	1,5867E+12
23-heinä-15	1,317E+12	1,4524E+12	1,2777E+12	0	1,5907E+12
24-heinä-15	1,2589E+12	1,4402E+12	1,2973E+12	0	1,5947E+12
25-heinä-15	1,2939E+12	1,3737E+12	1,2781E+12	0	1,5986E+12
26-heinä-15	1,8135E+12	1,2887E+12	1,286E+12	0	1,6026E+12
27-heinä-15	2,1958E+12	1,3474E+12	1,5498E+12	0	1,6066E+12
28-heinä-15	2,0382E+12	1,4807E+12	1,8728E+12	0	1,6106E+12
29-heinä-15	2,0138E+12	1,5904E+12	1,9555E+12	0	1,6146E+12
30-heinä-15	2,038E+12	1,7045E+12	1,9847E+12	0	1,6185E+12
31-heinä-15	2,1032E+12	1,8074E+12	2,0113E+12	0	1,6225E+12
01-elo-15	2,1766E+12	1,9281E+12	2,0573E+12	0	1,6265E+12
02-elo-15	1,9089E+12	2,0542E+12	2,1169E+12	0	1,6305E+12
03-elo-15	1,5542E+12	2,0678E+12	2,0129E+12	0	1,6344E+12
04-elo-15	1,7083E+12	1,9761E+12	1,7835E+12	0	1,6384E+12
05-elo-15	1,8539E+12	1,929E+12	1,7459E+12	0	1,6424E+12
06-elo-15	3,0408E+10	1,9061E+12	1,7999E+12	0	1,6464E+12
07-elo-15	1,2878E+12	1,6194E+12	9,1515E+11	0	1,6504E+12
08-elo-15	1,8005E+12	1,5029E+12	1,1015E+12	0	1,6543E+12
09-elo-15	1,8358E+12	1,4491E+12	1,451E+12	0	1,6583E+12
10-elo-15	1,5704E+12	1,4387E+12	1,6434E+12	0	1,6623E+12
11-elo-15	1,4682E+12	1,441E+12	1,6069E+12	0	1,6663E+12
12-elo-15	1,4883E+12	1,4067E+12	1,5376E+12	0	1,6703E+12
13-elo-15	1,3153E+12	1,3545E+12	1,5129E+12	0	1,6742E+12
14-elo-15	1,3756E+12	1,5381E+12	1,4141E+12	0	1,6782E+12
15-elo-15	1,3975E+12	1,5506E+12	1,3949E+12	0	1,6822E+12
16-elo-15	1,7789E+12	1,493E+12	1,3962E+12	0	1,6862E+12
17-elo-15	1,4219E+12	1,4849E+12	1,5876E+12	0	1,6901E+12
18-elo-15	1,4446E+12	1,4637E+12	1,5047E+12	0	1,6941E+12
19-elo-15	1,3372E+12	1,4603E+12	1,4746E+12	0	1,6981E+12
20-elo-15	2,7029E+12	1,4387E+12	1,4059E+12	0	1,7021E+12
21-elo-15	2,5366E+12	1,6369E+12	2,0544E+12	0	1,7061E+12

22-elo-15	3,1546E+12	1,8028E+12	2,2955E+12	0	1,71E+12
23-elo-15	3,4744E+12	2,0538E+12	2,7251E+12	0	1,714E+12
24-elo-15	1,4347E+12	2,296E+12	3,0998E+12	0	1,718E+12
25-elo-15	1,4437E+12	2,2979E+12	2,2672E+12	0	1,722E+12
26-elo-15	1,3741E+12	2,2977E+12	1,8554E+12	0	1,726E+12
27-elo-15	1,3178E+12	2,303E+12	1,6148E+12	0	1,7299E+12
28-elo-15	1,3383E+12	2,1051E+12	1,4663E+12	0	1,7339E+12
29-elo-15	1,3683E+12	1,9339E+12	1,4023E+12	0	1,7379E+12
30-elo-15	1,6199E+12	1,6787E+12	1,3853E+12	0	1,7419E+12
31-elo-15	1,6212E+12	1,4138E+12	1,5026E+12	0	1,7459E+12
01-syys-15		1,4404E+12	1,5619E+12	1,7891E+12	1,7498E+12
02-syys-15		1,44E+12	1,5322E+12	1,7938E+12	1,7538E+12
03-syys-15		1,4494E+12	1,5471E+12	1,7985E+12	1,7578E+12
04-syys-15		1,4682E+12	1,5396E+12	1,8033E+12	1,7618E+12
05-syys-15		1,4868E+12	1,5433E+12	1,808E+12	1,7657E+12
06-syys-15		1,5037E+12	1,5415E+12	1,8127E+12	1,7697E+12
07-syys-15		1,4871E+12	1,5424E+12	1,8174E+12	1,7737E+12
08-syys-15		1,4679E+12	1,542E+12	1,8222E+12	1,7777E+12
09-syys-15		1,4719E+12	1,5422E+12	1,8269E+12	1,7817E+12
10-syys-15		1,4764E+12	1,5421E+12	1,8316E+12	1,7856E+12
11-syys-15		1,4803E+12	1,5421E+12	1,8363E+12	1,7896E+12
12-syys-15		1,482E+12	1,5421E+12	1,841E+12	1,7936E+12
13-syys-15		1,4813E+12	1,5421E+12	1,8458E+12	1,7976E+12
14-syys-15		1,4781E+12	1,5421E+12	1,8505E+12	1,8016E+12
15-syys-15		1,4769E+12	1,5421E+12	1,8552E+12	1,8055E+12
16-syys-15		1,4781E+12	1,5421E+12	1,8599E+12	1,8095E+12
17-syys-15		1,479E+12	1,5421E+12	1,8647E+12	1,8135E+12
18-syys-15		1,4794E+12	1,5421E+12	1,8694E+12	1,8175E+12
19-syys-15		1,4793E+12	1,5421E+12	1,8741E+12	1,8214E+12
20-syys-15		1,4789E+12	1,5421E+12	1,8788E+12	1,8254E+12
21-syys-15		1,4785E+12	1,5421E+12	1,8835E+12	1,8294E+12
22-syys-15		1,4786E+12	1,5421E+12	1,8883E+12	1,8334E+12
23-syys-15		1,4788E+12	1,5421E+12	1,893E+12	1,8374E+12
24-syys-15		1,4789E+12	1,5421E+12	1,8977E+12	1,8413E+12
25-syys-15		1,4789E+12	1,5421E+12	1,9024E+12	1,8453E+12
26-syys-15		1,4788E+12	1,5421E+12	1,9071E+12	1,8493E+12
27-syys-15		1,4788E+12	1,5421E+12	1,9119E+12	1,8533E+12
28-syys-15		1,4788E+12	1,5421E+12	1,9166E+12	1,8573E+12
29-syys-15		1,4788E+12	1,5421E+12	1,9213E+12	1,8612E+12
30-syys-15		1,4788E+12	1,5421E+12	1,926E+12	1,8652E+12

APPENDIX 15. Twitch forecast by week

Period	Real Bytes	Moving Av	SES	DES	Least Square
06-kesä-15	8,7594E+12	0	0	0	9,28085E+12
13-kesä-15	9,8804E+12	0	8,7594E+12	0	9,53817E+12
20-kesä-15	1,0556E+13	0	8,7594E+12	0	9,79549E+12
27-kesä-15	9,823E+12	9,7319E+12	9,6576E+12	0	1,00528E+13
03-heinä-15	1,0856E+13	1,0086E+13	9,7403E+12	0	1,03101E+13
05-heinä-15	1,0212E+13	1,0412E+13	1,0298E+13	0	1,05675E+13
18-heinä-15	1,0512E+13	1,0297E+13	1,0255E+13	0	1,08248E+13
25-heinä-15	9,0211E+12	1,0527E+13	1,0384E+13	0	1,10821E+13
01-elo-15	1,4379E+13	9,9151E+12	9,7024E+12	0	1,13394E+13
08-elo-15	1,0144E+13	1,1304E+13	1,2041E+13	0	1,15967E+13
15-elo-15	1,0451E+13	1,1181E+13	1,1092E+13	0	1,18541E+13
22-elo-15	1,4377E+13	1,1658E+13	1,0772E+13	0	1,21114E+13
29-elo-15	1,1751E+13	1,1657E+13	1,2574E+13	0	1,23687E+13
05-syys-15		1,2193E+13	1,2163E+13	1,0726E+13	1,2626E+13
12-syys-15		1,2774E+13	1,2368E+13	1,0712E+13	1,28833E+13
19-syys-15		1,2239E+13	1,2266E+13	1,0699E+13	1,31407E+13
26-syys-15		1,2402E+13	1,2317E+13	1,0686E+13	1,3398E+13

APPENDIX 16. Twitch forecast by Month

Period	Real Bytes	Moving Av	Least Square
30-kesä-15	4,3899E+13	0	4,3867E+13
31-heinä-15	4,7924E+13	0	4,7988E+13
31-elo-15	5,2141E+13	4,5911E+13	5,2109E+13
30-syys-15		5,0032E+13	5,6229E+13
31-loka-15		5,1086E+13	6,035E+13
30-marras-15		5,0559E+13	6,4471E+13

APPENDIX 17. Facebook Forecast by day

Period	Real Bytes	Moving Av	SES	DES	Least Square
01-kesä-15	4,4138E+11	0	0	0	4,1202E+11
02-kesä-15	4,1861E+11	0	4,4138E+11	0	4,1187E+11
03-kesä-15	4,6467E+11	0	4,4138E+11	0	4,1171E+11
04-kesä-15	3,9906E+11	0	4,5303E+11	0	4,1155E+11
05-kesä-15	3,5875E+11	0	4,2604E+11	0	4,1139E+11
06-kesä-15	4,0836E+11	0	3,924E+11	0	4,1124E+11
07-kesä-15	4,6293E+11	0	4,0038E+11	0	4,1108E+11
08-kesä-15	4,021E+11	4,2197E+11	4,3165E+11	0	4,1092E+11
09-kesä-15	4,0158E+11	4,1635E+11	4,1688E+11	0	4,1076E+11
10-kesä-15	4,2167E+11	4,1392E+11	4,0923E+11	0	4,1061E+11
11-kesä-15	4,2696E+11	4,0778E+11	4,1545E+11	0	4,1045E+11
12-kesä-15	3,7905E+11	4,1176E+11	4,212E+11	0	4,1029E+11
13-kesä-15	3,4115E+11	4,1466E+11	4,0013E+11	0	4,1014E+11
14-kesä-15	4,4284E+11	4,0506E+11	3,7064E+11	0	4,0998E+11
15-kesä-15	4,1113E+11	4,0219E+11	4,0674E+11	0	4,0982E+11
16-kesä-15	4,5803E+11	4,0348E+11	4,0894E+11	0	4,0966E+11
17-kesä-15	4,3872E+11	4,1155E+11	4,3348E+11	0	4,0951E+11
18-kesä-15	4,0947E+11	4,1398E+11	4,361E+11	0	4,0935E+11
19-kesä-15	3,3827E+11	4,1149E+11	4,2279E+11	0	4,0919E+11
20-kesä-15	3,1658E+11	4,0566E+11	3,8053E+11	0	4,0903E+11
21-kesä-15	4,3875E+11	4,0215E+11	3,4856E+11	0	4,0888E+11
22-kesä-15	4,5292E+11	4,0157E+11	3,9365E+11	0	4,0872E+11
23-kesä-15	4,1467E+11	4,0754E+11	4,2329E+11	0	4,0856E+11
24-kesä-15	4,9153E+11	4,0134E+11	4,1898E+11	0	4,0841E+11
25-kesä-15	4,667E+11	4,0889E+11	4,5526E+11	0	4,0825E+11
26-kesä-15	4,3854E+11	4,1706E+11	4,6098E+11	0	4,0809E+11
27-kesä-15	4,1699E+11	4,3139E+11	4,4976E+11	0	4,0793E+11
28-kesä-15	4,3481E+11	4,4573E+11	4,3337E+11	0	4,0778E+11
29-kesä-15	4,3748E+11	4,4517E+11	4,3409E+11	0	4,0762E+11
30-kesä-15	4,4255E+11	4,4296E+11	4,3578E+11	0	4,0746E+11
01-heinä-15	4,0142E+11	4,4694E+11	4,3917E+11	0	4,073E+11
02-heinä-15	3,9839E+11	4,3407E+11	4,2029E+11	0	4,0715E+11
03-heinä-15	3,2314E+11	4,2431E+11	4,0934E+11	0	4,0699E+11
04-heinä-15	3,3772E+11	4,0782E+11	3,6624E+11	0	4,0683E+11
05-heinä-15	3,904E+11	3,965E+11	3,5198E+11	0	4,0668E+11
06-heinä-15	3,8847E+11	3,9016E+11	3,7119E+11	0	4,0652E+11
07-heinä-15	4,4875E+11	3,8316E+11	3,7983E+11	0	4,0636E+11
08-heinä-15	4,5118E+11	3,8404E+11	4,1429E+11	0	4,062E+11
09-heinä-15	4,6523E+11	3,9115E+11	4,3273E+11	0	4,0605E+11

10-heinä-15	4,1262E+11	4,007E+11	4,4898E+11	0	4,0589E+11
11-heinä-15	3,4791E+11	4,1348E+11	4,308E+11	0	4,0573E+11
12-heinä-15	4,1277E+11	4,1494E+11	3,8936E+11	0	4,0557E+11
13-heinä-15	4,0447E+11	4,1813E+11	4,0106E+11	0	4,0542E+11
14-heinä-15	4,0748E+11	4,2042E+11	4,0277E+11	0	4,0526E+11
15-heinä-15	4,4086E+11	4,1452E+11	4,0512E+11	0	4,051E+11
16-heinä-15	3,953E+11	4,1305E+11	4,2299E+11	0	4,0495E+11
17-heinä-15	3,3808E+11	4,0306E+11	4,0915E+11	0	4,0479E+11
18-heinä-15	3,345E+11	3,9241E+11	3,7361E+11	0	4,0463E+11
19-heinä-15	3,7467E+11	3,905E+11	3,5406E+11	0	4,0447E+11
20-heinä-15	3,8232E+11	3,8505E+11	3,6437E+11	0	4,0432E+11
21-heinä-15	3,671E+11	3,8189E+11	3,7334E+11	0	4,0416E+11
22-heinä-15	4,0288E+11	3,7612E+11	3,7022E+11	0	4,04E+11
23-heinä-15	4,2313E+11	3,7069E+11	3,8655E+11	0	4,0384E+11
24-heinä-15	3,9635E+11	3,7467E+11	4,0484E+11	0	4,0369E+11
25-heinä-15	3,2232E+11	3,8299E+11	4,006E+11	0	4,0353E+11
26-heinä-15	4,6284E+11	3,8125E+11	3,6146E+11	0	4,0337E+11
27-heinä-15	4,6548E+11	3,9385E+11	4,1215E+11	0	4,0322E+11
28-heinä-15	4,3079E+11	4,0573E+11	4,3881E+11	0	4,0306E+11
29-heinä-15	4,3974E+11	4,1483E+11	4,348E+11	0	4,029E+11
30-heinä-15	4,2549E+11	4,2009E+11	4,3727E+11	0	4,0274E+11
31-heinä-15	4,1726E+11	4,2043E+11	4,3138E+11	0	4,0259E+11
01-elo-15	3,6943E+11	4,2342E+11	4,2432E+11	0	4,0243E+11
02-elo-15	4,2632E+11	4,3015E+11	3,9687E+11	0	4,0227E+11
03-elo-15	4,2082E+11	4,2493E+11	4,116E+11	0	4,0211E+11
04-elo-15	3,8285E+11	4,1855E+11	4,1621E+11	0	4,0196E+11
05-elo-15	3,6389E+11	4,117E+11	3,9953E+11	0	4,018E+11
06-elo-15	240045629	4,0087E+11	3,8171E+11	0	4,0164E+11
07-elo-15	2,7629E+11	3,4012E+11	1,9097E+11	0	4,0148E+11
08-elo-15	3,5773E+11	3,1998E+11	2,3363E+11	0	4,0133E+11
09-elo-15	4,3151E+11	3,1831E+11	2,9568E+11	0	4,0117E+11
10-elo-15	4,3044E+11	3,1905E+11	3,636E+11	0	4,0101E+11
11-elo-15	4,5331E+11	3,2042E+11	3,9702E+11	0	4,0086E+11
12-elo-15	4,4959E+11	3,3049E+11	4,2517E+11	0	4,007E+11
13-elo-15	4,2541E+11	3,4273E+11	4,3738E+11	0	4,0054E+11
14-elo-15	4,0019E+11	4,0347E+11	4,3139E+11	0	4,0038E+11
15-elo-15	3,8451E+11	4,2117E+11	4,1579E+11	0	4,0023E+11
16-elo-15	4,7239E+11	4,2499E+11	4,0015E+11	0	4,0007E+11
17-elo-15	4,0119E+11	4,3083E+11	4,3627E+11	0	3,9991E+11
18-elo-15	3,8889E+11	4,2666E+11	4,1873E+11	0	3,9975E+11
19-elo-15	4,1185E+11	4,1745E+11	4,0381E+11	0	3,996E+11
20-elo-15	4,1886E+11	4,1206E+11	4,0783E+11	0	3,9944E+11
21-elo-15	3,8734E+11	4,1112E+11	4,1334E+11	0	3,9928E+11

22-elo-15	3,7912E+11	4,0929E+11	4,0034E+11	0	3,9913E+11
23-elo-15	4,3601E+11	4,0852E+11	3,8973E+11	0	3,9897E+11
24-elo-15	3,9098E+11	4,0332E+11	4,1287E+11	0	3,9881E+11
25-elo-15	4,0657E+11	4,0186E+11	4,0192E+11	0	3,9865E+11
26-elo-15	4,482E+11	4,0439E+11	4,0424E+11	0	3,985E+11
27-elo-15	4,5165E+11	4,0958E+11	4,2622E+11	0	3,9834E+11
28-elo-15	4,3391E+11	4,1427E+11	4,3893E+11	0	3,9818E+11
29-elo-15	3,4985E+11	4,2092E+11	4,3642E+11	0	3,9802E+11
30-elo-15	4,5614E+11	4,1674E+11	3,9313E+11	0	3,9787E+11
31-elo-15	4,569E+11	4,1961E+11	4,2464E+11	0	3,9771E+11
01-syys-15		4,2903E+11	4,4077E+11	3,8787E+11	3,9755E+11
02-syys-15		4,3224E+11	4,327E+11	3,8751E+11	3,974E+11
03-syys-15		4,2996E+11	4,3674E+11	3,8716E+11	3,9724E+11
04-syys-15		4,2686E+11	4,3472E+11	3,868E+11	3,9708E+11
05-syys-15		4,2585E+11	4,3573E+11	3,8644E+11	3,9692E+11
06-syys-15		4,3671E+11	4,3522E+11	3,8608E+11	3,9677E+11
07-syys-15		4,3394E+11	4,3548E+11	3,8572E+11	3,9661E+11
08-syys-15		4,3066E+11	4,3535E+11	3,8537E+11	3,9645E+11
09-syys-15		4,3089E+11	4,3541E+11	3,8501E+11	3,9629E+11
10-syys-15		4,3069E+11	4,3538E+11	3,8465E+11	3,9614E+11
11-syys-15		4,308E+11	4,354E+11	3,8429E+11	3,9598E+11
12-syys-15		4,3136E+11	4,3539E+11	3,8394E+11	3,9582E+11
13-syys-15		4,3215E+11	4,3539E+11	3,8358E+11	3,9567E+11
14-syys-15		4,315E+11	4,3539E+11	3,8322E+11	3,9551E+11
15-syys-15		4,3115E+11	4,3539E+11	3,8286E+11	3,9535E+11
16-syys-15		4,3122E+11	4,3539E+11	3,825E+11	3,9519E+11
17-syys-15		4,3127E+11	4,3539E+11	3,8215E+11	3,9504E+11
18-syys-15		4,3135E+11	4,3539E+11	3,8179E+11	3,9488E+11
19-syys-15		4,3143E+11	4,3539E+11	3,8143E+11	3,9472E+11
20-syys-15		4,3144E+11	4,3539E+11	3,8107E+11	3,9456E+11
21-syys-15		4,3134E+11	4,3539E+11	3,8072E+11	3,9441E+11
22-syys-15		4,3131E+11	4,3539E+11	3,8036E+11	3,9425E+11
23-syys-15		4,3134E+11	4,3539E+11	3,8E+11	3,9409E+11
24-syys-15		4,3135E+11	4,3539E+11	3,7964E+11	3,9394E+11
25-syys-15		4,3136E+11	4,3539E+11	3,7928E+11	3,9378E+11
26-syys-15		4,3137E+11	4,3539E+11	3,7893E+11	3,9362E+11
27-syys-15		4,3136E+11	4,3539E+11	3,7857E+11	3,9346E+11
28-syys-15		4,3135E+11	4,3539E+11	3,7821E+11	3,9331E+11
29-syys-15		4,3135E+11	4,3539E+11	3,7785E+11	3,9315E+11
30-syys-15		4,3135E+11	4,3539E+11	3,775E+11	3,9299E+11

APPENDIX 18. Facebook Forecast by week

Period	Real Bytes	Moving av	SES	DES	Least Square
06-kesä-15	2,4908E+12	0	0	0	2,766E+12
13-kesä-15	2,8354E+12	0	2,4908E+12	0	2,7709E+12
20-kesä-15	2,8151E+12	0	2,4908E+12	0	2,7757E+12
27-kesä-15	3,1201E+12	2,7138E+12	2,6529E+12	0	2,7805E+12
04-heinä-15	2,7755E+12	2,9235E+12	2,8865E+12	0	2,7853E+12
11-heinä-15	2,9046E+12	2,9036E+12	2,831E+12	0	2,7902E+12
18-heinä-15	2,7335E+12	2,9334E+12	2,8678E+12	0	2,795E+12
25-heinä-15	2,6688E+12	2,8045E+12	2,8006E+12	0	2,7998E+12
01-elo-15	3,011E+12	2,7689E+12	2,7347E+12	0	2,8046E+12
08-elo-15	2,2281E+12	2,8044E+12	2,8729E+12	0	2,8094E+12
15-elo-15	2,975E+12	2,636E+12	2,5505E+12	0	2,8143E+12
22-elo-15	2,8596E+12	2,738E+12	2,7627E+12	0	2,8191E+12
29-elo-15	2,9171E+12	2,6876E+12	2,8112E+12	0	2,8239E+12
05-syys-15		2,9172E+12	2,8642E+12	2,1668E+12	2,8287E+12
12-syys-15		2,898E+12	2,8377E+12	2,083E+12	2,8336E+12
19-syys-15		2,9108E+12	2,8509E+12	1,9993E+12	2,8384E+12
26-syys-15		2,9087E+12	2,8443E+12	1,9155E+12	2,8432E+12

APPENDIX 19. Facebook Forecast by Month

Period	Real bytes	Moving Av	Least Square
30-kesä-15	1,2576E+13	0	1,2573E+13
31-heinä-15	1,2409E+13	0	1,2416E+13
31-elo-15	1,2262E+13	1,2493E+13	1,2259E+13
30-syys-15		1,2336E+13	1,2102E+13
31-loka-15		1,2299E+13	1,1945E+13
30-marras-15		1,2317E+13	1,1788E+13

APPENDIX 20. HTTP Forecast by day

Period	Real Bytes	Moving Av	SES	DES	Least Square
01-kesä-15	1,0842E+12	0	0	0	9,8619E+11
02-kesä-15	9,5559E+11	0	1,0842E+12	0	9,8486E+11
03-kesä-15	8,812E+11	0	1,0842E+12	0	9,8352E+11
04-kesä-15	9,9559E+11	0	9,827E+11	0	9,8219E+11
05-kesä-15	8,8671E+11	0	9,8914E+11	0	9,8085E+11
06-kesä-15	1,0707E+12	0	9,3793E+11	0	9,7952E+11
07-kesä-15	1,3649E+12	0	1,0043E+12	0	9,7818E+11
08-kesä-15	1,1093E+12	1,0341E+12	1,1846E+12	0	9,7685E+11
09-kesä-15	1,0329E+12	1,0377E+12	1,147E+12	0	9,7551E+11
10-kesä-15	1,1406E+12	1,0488E+12	1,09E+12	0	9,7418E+11
11-kesä-15	8,9134E+11	1,0858E+12	1,1153E+12	0	9,7285E+11
12-kesä-15	8,2071E+11	1,0709E+12	1,0033E+12	0	9,7151E+11
13-kesä-15	8,6521E+11	1,0615E+12	9,1201E+11	0	9,7018E+11
14-kesä-15	1,1539E+12	1,0322E+12	8,8861E+11	0	9,6884E+11
15-kesä-15	9,7987E+11	1,002E+12	1,0213E+12	0	9,6751E+11
16-kesä-15	9,4977E+11	9,8352E+11	1,0006E+12	0	9,6617E+11
17-kesä-15	9,4491E+11	9,7163E+11	9,7517E+11	0	9,6484E+11
18-kesä-15	9,0569E+11	9,4367E+11	9,6004E+11	0	9,6351E+11
19-kesä-15	7,088E+11	9,4572E+11	9,3287E+11	0	9,6217E+11
20-kesä-15	7,4899E+11	9,2974E+11	8,2083E+11	0	9,6084E+11
21-kesä-15	9,1906E+11	9,1314E+11	7,8491E+11	0	9,595E+11
22-kesä-15	1,0199E+12	8,7958E+11	8,5198E+11	0	9,5817E+11
23-kesä-15	9,9485E+11	8,8531E+11	9,3596E+11	0	9,5683E+11
24-kesä-15	1,2338E+12	8,9175E+11	9,6541E+11	0	9,555E+11
25-kesä-15	9,4399E+11	9,3302E+11	1,0996E+12	0	9,5416E+11
26-kesä-15	8,7371E+11	9,3849E+11	1,0218E+12	0	9,5283E+11
27-kesä-15	9,0001E+11	9,6204E+11	9,4775E+11	0	9,515E+11
28-kesä-15	8,9728E+11	9,8362E+11	9,2388E+11	0	9,5016E+11
29-kesä-15	1,0604E+12	9,8051E+11	9,1058E+11	0	9,4883E+11
30-kesä-15	1,087E+12	9,8629E+11	9,8549E+11	0	9,4749E+11
01-heinä-15	9,1303E+11	9,9945E+11	1,0362E+12	0	9,4616E+11
02-heinä-15	8,3439E+11	9,5363E+11	9,7463E+11	0	9,4482E+11
03-heinä-15	7,1063E+11	9,3797E+11	9,0451E+11	0	9,4349E+11
04-heinä-15	7,5177E+11	9,1468E+11	8,0757E+11	0	9,4215E+11
05-heinä-15	8,3528E+11	8,935E+11	7,7967E+11	0	9,4082E+11
06-heinä-15	9,677E+11	8,8464E+11	8,0748E+11	0	9,3949E+11
07-heinä-15	1,0376E+12	8,714E+11	8,8759E+11	0	9,3815E+11
08-heinä-15	9,9557E+11	8,6435E+11	9,6261E+11	0	9,3682E+11
09-heinä-15	1,2635E+12	8,7614E+11	9,7909E+11	0	9,3548E+11

10-heinä-15	8,9242E+11	9,3745E+11	1,1213E+12	0	9,3415E+11
11-heinä-15	8,0844E+11	9,6342E+11	1,0069E+12	0	9,3281E+11
12-heinä-15	9,0981E+11	9,7151E+11	9,0765E+11	0	9,3148E+11
13-heinä-15	8,4913E+11	9,8216E+11	9,0873E+11	0	9,3014E+11
14-heinä-15	9,4612E+11	9,6522E+11	8,7893E+11	0	9,2881E+11
15-heinä-15	9,5282E+11	9,5215E+11	9,1252E+11	0	9,2748E+11
16-heinä-15	9,9201E+11	9,4604E+11	9,3267E+11	0	9,2614E+11
17-heinä-15	7,2751E+11	9,0725E+11	9,6234E+11	0	9,2481E+11
18-heinä-15	9,1391E+11	8,8369E+11	8,4493E+11	0	9,2347E+11
19-heinä-15	9,9741E+11	8,9876E+11	8,7942E+11	0	9,2214E+11
20-heinä-15	9,4525E+11	9,1127E+11	9,3841E+11	0	9,208E+11
21-heinä-15	9,004E+11	9,25E+11	9,4183E+11	0	9,1947E+11
22-heinä-15	1,0204E+12	9,1847E+11	9,2111E+11	0	9,1813E+11
23-heinä-15	9,8369E+11	9,2812E+11	9,7075E+11	0	9,168E+11
24-heinä-15	9,0787E+11	9,2694E+11	9,7722E+11	0	9,1547E+11
25-heinä-15	7,2227E+11	9,527E+11	9,4255E+11	0	9,1413E+11
26-heinä-15	1,1493E+12	9,2532E+11	8,3241E+11	0	9,128E+11
27-heinä-15	1,0644E+12	9,4703E+11	9,9086E+11	0	9,1146E+11
28-heinä-15	8,7966E+11	9,6405E+11	1,0276E+12	0	9,1013E+11
29-heinä-15	9,2277E+11	9,6108E+11	9,5365E+11	0	9,0879E+11
30-heinä-15	9,3434E+11	9,4714E+11	9,3821E+11	0	9,0746E+11
31-heinä-15	8,6835E+11	9,4009E+11	9,3627E+11	0	9,0612E+11
01-elo-15	9,0391E+11	9,3444E+11	9,0231E+11	0	9,0479E+11
02-elo-15	9,6112E+11	9,6039E+11	9,0311E+11	0	9,0346E+11
03-elo-15	9,4783E+11	9,3351E+11	9,3212E+11	0	9,0212E+11
04-elo-15	8,7691E+11	9,1685E+11	9,3997E+11	0	9,0079E+11
05-elo-15	7,8089E+11	9,1646E+11	9,0844E+11	0	8,9945E+11
06-elo-15	7149317210	8,9619E+11	8,4466E+11	0	8,9812E+11
07-elo-15	6,1894E+11	7,6374E+11	4,2591E+11	0	8,9678E+11
08-elo-15	8,725E+11	7,2811E+11	5,2242E+11	0	8,9545E+11
09-elo-15	1,0091E+12	7,2362E+11	6,9746E+11	0	8,9412E+11
10-elo-15	9,502E+11	7,3048E+11	8,5329E+11	0	8,9278E+11
11-elo-15	9,6265E+11	7,3081E+11	9,0174E+11	0	8,9145E+11
12-elo-15	1,0076E+12	7,4306E+11	9,322E+11	0	8,9011E+11
13-elo-15	8,9236E+11	7,7545E+11	9,699E+11	0	8,8878E+11
14-elo-15	7,6274E+11	9,0191E+11	9,3113E+11	0	8,8744E+11
15-elo-15	7,89E+11	9,2245E+11	8,4694E+11	0	8,8611E+11
16-elo-15	1,0275E+12	9,1053E+11	8,1797E+11	0	8,8477E+11
17-elo-15	1,0229E+12	9,1315E+11	9,2275E+11	0	8,8344E+11
18-elo-15	8,7694E+11	9,2354E+11	9,7283E+11	0	8,8211E+11
19-elo-15	8,3135E+11	9,113E+11	9,2488E+11	0	8,8077E+11
20-elo-15	8,702E+11	8,8612E+11	8,7812E+11	0	8,7944E+11
21-elo-15	9,28E+11	8,8295E+11	8,7416E+11	0	8,781E+11

22-elo-15	8,3335E+11	9,0656E+11	9,0108E+11	0	8,7677E+11
23-elo-15	9,9012E+11	9,1289E+11	8,6721E+11	0	8,7543E+11
24-elo-15	9,3185E+11	9,0755E+11	9,2866E+11	0	8,741E+11
25-elo-15	8,8256E+11	8,9454E+11	9,3026E+11	0	8,7276E+11
26-elo-15	1,045E+12	8,9535E+11	9,0641E+11	0	8,7143E+11
27-elo-15	1,0464E+12	9,2587E+11	9,757E+11	0	8,701E+11
28-elo-15	8,7081E+11	9,5104E+11	1,0111E+12	0	8,6876E+11
29-elo-15	7,145E+11	9,4287E+11	9,4094E+11	0	8,6743E+11
30-elo-15	1,0089E+12	9,2589E+11	8,2772E+11	0	8,6609E+11
31-elo-15	9,0145E+11	9,2858E+11	9,1833E+11	0	8,6476E+11
01-syys-15		9,2424E+11	9,0989E+11	8,5771E+11	8,6342E+11
02-syys-15		9,302E+11	9,1411E+11	8,5628E+11	8,6209E+11
03-syys-15		9,138E+11	9,12E+11	8,5485E+11	8,6075E+11
04-syys-15		8,9485E+11	9,1306E+11	8,5343E+11	8,5942E+11
05-syys-15		8,9828E+11	9,1253E+11	8,52E+11	8,5809E+11
06-syys-15		9,2454E+11	9,1279E+11	8,5057E+11	8,5675E+11
07-syys-15		9,1248E+11	9,1266E+11	8,4915E+11	8,5542E+11
08-syys-15		9,1405E+11	9,1273E+11	8,4772E+11	8,5408E+11
09-syys-15		9,126E+11	9,1269E+11	8,4629E+11	8,5275E+11
10-syys-15		9,1008E+11	9,1271E+11	8,4487E+11	8,5141E+11
11-syys-15		9,0955E+11	9,127E+11	8,4344E+11	8,5008E+11
12-syys-15		9,1166E+11	9,1271E+11	8,4201E+11	8,4874E+11
13-syys-15		9,1357E+11	9,127E+11	8,4059E+11	8,4741E+11
14-syys-15		9,12E+11	9,127E+11	8,3916E+11	8,4608E+11
15-syys-15		9,1193E+11	9,127E+11	8,3773E+11	8,4474E+11
16-syys-15		9,1163E+11	9,127E+11	8,3631E+11	8,4341E+11
17-syys-15		9,1149E+11	9,127E+11	8,3488E+11	8,4207E+11
18-syys-15		9,1169E+11	9,127E+11	8,3345E+11	8,4074E+11
19-syys-15		9,1199E+11	9,127E+11	8,3203E+11	8,394E+11
20-syys-15		9,1204E+11	9,127E+11	8,306E+11	8,3807E+11
21-syys-15		9,1182E+11	9,127E+11	8,2917E+11	8,3674E+11
22-syys-15		9,118E+11	9,127E+11	8,2775E+11	8,354E+11
23-syys-15		9,1178E+11	9,127E+11	8,2632E+11	8,3407E+11
24-syys-15		9,118E+11	9,127E+11	8,2489E+11	8,3273E+11
25-syys-15		9,1185E+11	9,127E+11	8,2347E+11	8,314E+11
26-syys-15		9,1187E+11	9,127E+11	8,2204E+11	8,3006E+11
27-syys-15		9,1185E+11	9,127E+11	8,2061E+11	8,2873E+11
28-syys-15		9,1182E+11	9,127E+11	8,1919E+11	8,2739E+11
29-syys-15		9,1182E+11	9,127E+11	8,1776E+11	8,2606E+11
30-syys-15		9,1183E+11	9,127E+11	8,1633E+11	8,2473E+11

APPENDIX 21. HTTP Forecast by week

Period	Real Bytes	Moving Av	SES	DES	Least - square
06-kesä-15	5,874E+12	0	0	0	6,58223E+12
13-kesä-15	7,2251E+12	0	5,874E+12	0	6,55228E+12
20-kesä-15	6,392E+12	0	5,874E+12	0	6,52234E+12
27-kesä-15	6,8853E+12	6,497E+12	6,133E+12	0	6,49239E+12
04-heinä-15	6,2545E+12	6,8341E+12	6,5091E+12	0	6,46245E+12
11-heinä-15	6,8006E+12	6,5106E+12	6,3818E+12	0	6,4325E+12
18-heinä-15	6,2913E+12	6,6468E+12	6,5912E+12	0	6,40256E+12
25-heinä-15	6,4773E+12	6,4488E+12	6,4413E+12	0	6,37261E+12
01-elo-15	6,7228E+12	6,5231E+12	6,4593E+12	0	6,34267E+12
08-elo-15	5,0653E+12	6,4971E+12	6,591E+12	0	6,31272E+12
15-elo-15	6,3737E+12	6,0885E+12	5,8282E+12	0	6,28277E+12
22-elo-15	6,3903E+12	6,0539E+12	6,1009E+12	0	6,25283E+12
29-elo-15	6,4813E+12	5,9431E+12	6,2456E+12	0	6,22288E+12
05-syys-15		6,4151E+12	6,3634E+12	4,6917E+12	6,19294E+12
12-syys-15		6,4289E+12	6,3045E+12	4,4636E+12	6,16299E+12
19-syys-15		6,4417E+12	6,334E+12	4,2355E+12	6,13305E+12
26-syys-15		6,4286E+12	6,3192E+12	4,0074E+12	6,1031E+12

APPENDIX 22. HTTP Forecast by Month

Period	Real Bytes	Moving Av	Least Square
30-kesä-15	2,9421E+13	0	2,9529E+13
31-heinä-15	2,8598E+13	0	2,8381E+13
31-elo-15	2,7125E+13	2,9009E+13	2,7233E+13
30-syys-15		2,7861E+13	2,6085E+13
31-loka-15		2,7493E+13	2,4937E+13
30-marras-15		2,7677E+13	2,3789E+13