

# ARTES Application Workshop

*Rome, April 18<sup>th</sup> 19<sup>th</sup> 2013*

## Project “Lift Off”

## Artes 3-4 Satcom

### Deep Packet Inspection solutions for Internet via Satellite



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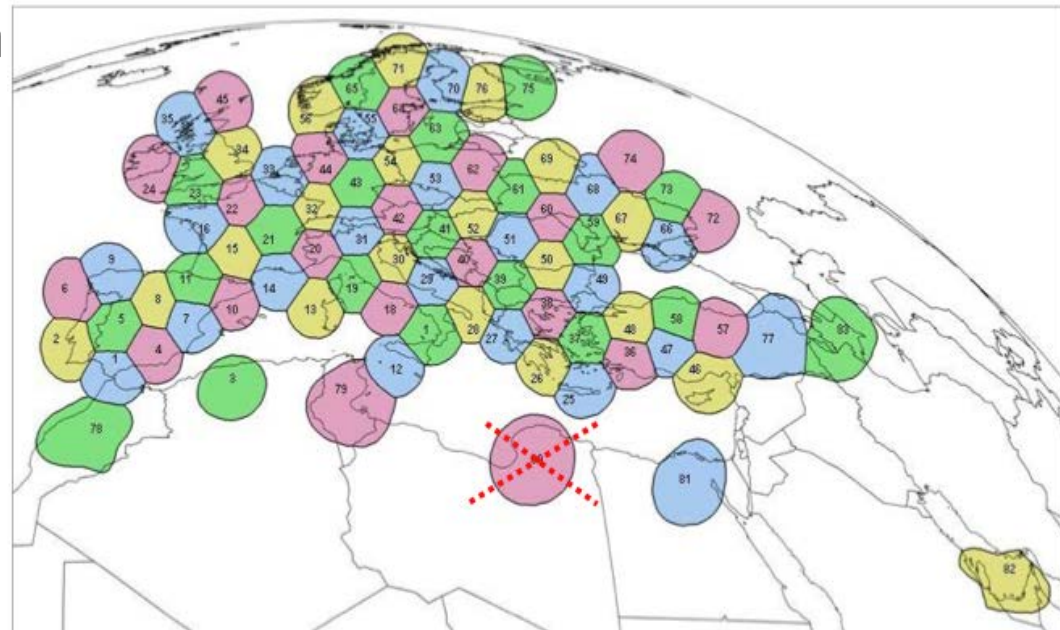


# The magic moment

- Internet is a booming market
  - It is like bringing water in the houses
  - Now everybody want to see the world with their eyes (and play and work and watch, and read ,etc)
- Satellite plays an irreplaceable role to ensure connectivity everywhere to everyone and can play an even more important role in the next future if we are able to improve performance and the commercial offer

# The magic technology

- KA-Multispot Satellite are incredible architecture
- ALL-IP SAT is a flexible and powerful platforms
  - For service creation
  - For traffic control



# But life is not easy...

- Competition and user demands on internet is very high

Performances

Vs

Prices

Vs

User experience

Vs

Margins/costs

# Scope of the project ,how, objective

- Scope: Optimize all these parameter...
  - Performances, prices, margin, user experience
- How: putting «intelligence» over the muscle
  - Intelligence = DPI
  - Muscle = KA-Multispot- ALL IP Satellite
- Objective:
  - Create new innovative profiles (see later the results)
  - Create cost efficient profiles
  - Create a proper metric to measure the user experience

# Methodology

PH1

Definition of  
Market Segment

B2B

- Office
- Telemetry
- Videocontrol

B2C

- Tecnofun
- Aged
- ...

PH2

Define  
Requirements for  
each Cluster

«Cluster ID»

- FLAT
- Cheap
- Public IP
- Yes/No P2P
- CIR

PH3

Define Products

«Product ID»

- **Name**
- **Service Requirements**
- **Network Metric Performance**
- **User Metric Performances**

PH4

Create Products  
(System  
Requirements, DPI  
Rules

- System Requirements
- **Implement Rules in DPI**

PH5

Simulation/Emulation

First check on NMP and UMP

PH6

Trial

How Communicate to customer the  
new feature/benefits

How to make Customer care

# TRIAL PROFILES ON B2B

Downlink	Uplink	Traffico	Indirizzo IP	Prezzo
8 Mbps	2 Mbps	Flat	1 pubblico statico	120 € + Iva

NMP: Consumption below 50kbps average

Nome	Downlink	Uplink	Traffico Riservato	Indirizzo IP	Banda Garantita	Prezzo
Pro	4 Mbps	2 Mbps	Flat	1 statico	- /150 Kbps	€199,00 + Iva

NMP: Consumption below 100kbps average in uplink but guaranteed



# TRIAL PROFILES ON B2B

Downlink Uplink Traffico Indirizzo IP Prezzo mensile

128 Kbps 256 Kbps Flat 1 pubblico statico €29,00 + Iva

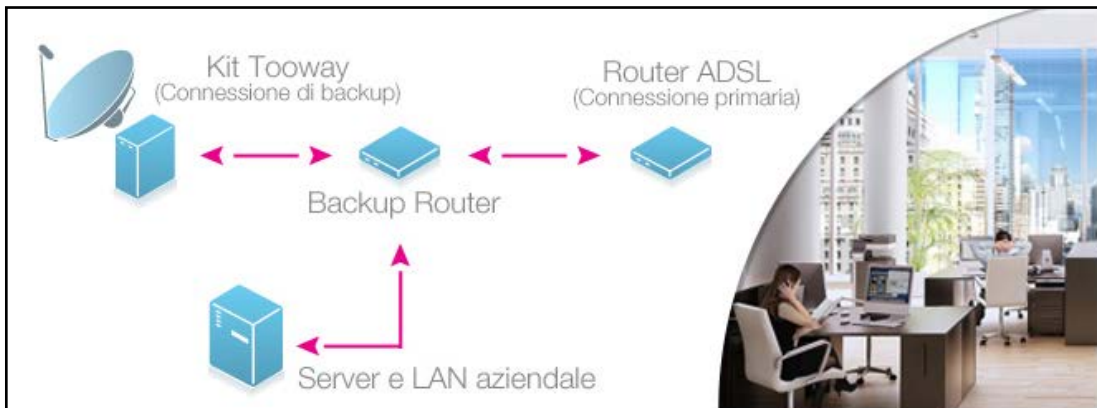
256 Kbps 256 Kbps Flat 1 pubblico statico €35,00 + Iva

256 Kbps 512 Kbps Flat 1 pubblico statico €49,00 + Iva

NMP: Consumption below 32-64-128kbps average in uplink but guaranteed



eutelsat



Downlink Uplink Traffico Indirizzo IP Prezzo  
8 Mbps 2 Mbps A consumo.  
€13,00 + IVA a gigabyte. Il primo giga è incluso. 1 pubblico statico 9 € + Iva mese

Acquista



# Pilot B2C profile

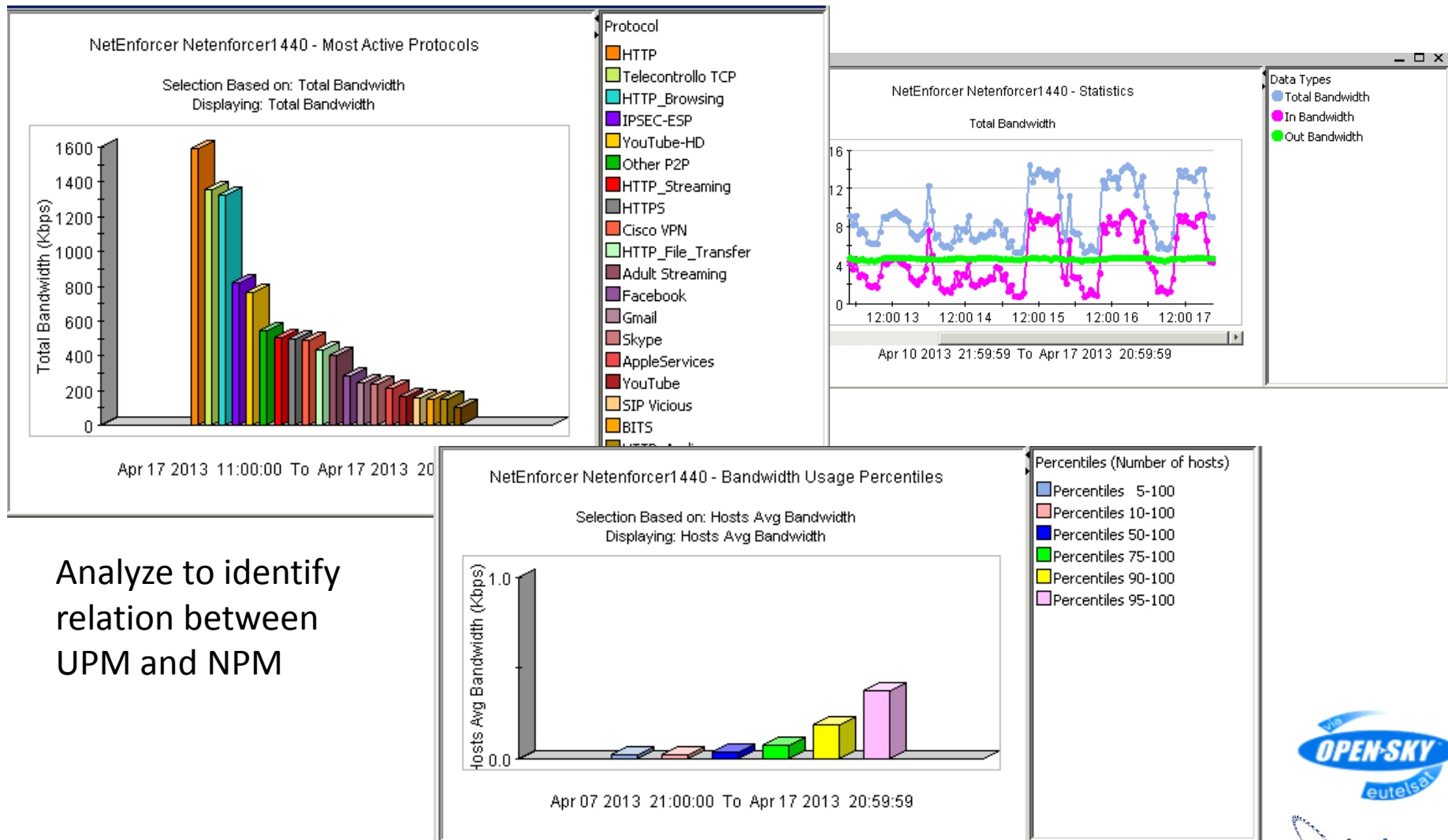
- 8 Mbps downlink
- 2 Mbps uplink
- Flat
- Dinamic IP Address with NAT
- 49€/month
- Lower priority on traffic

NMP: Consumption below 35kbps average

# DPI

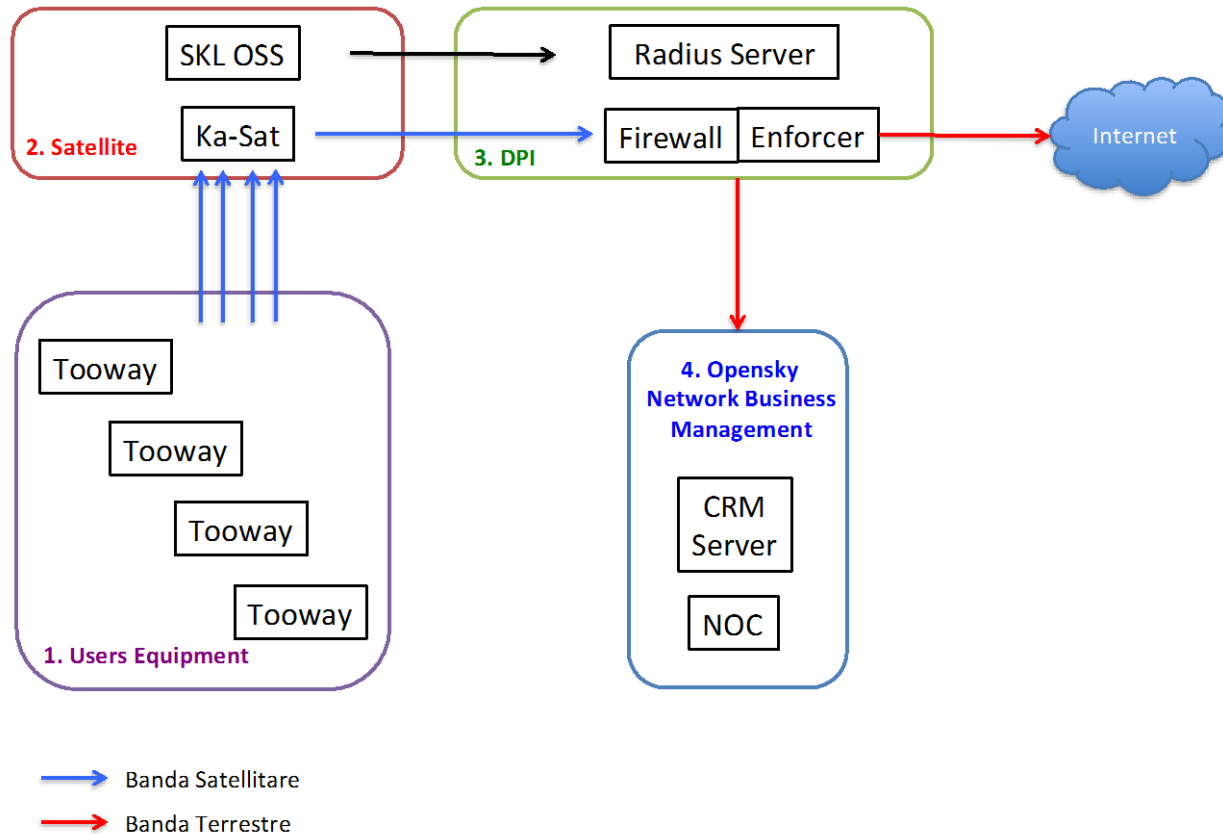
- Deep Packet Inspection.
- It allows
  - 1) detect all type of traffic per single user
  - 2) apply specific rules and policies over the traffic
- → Create a «magic formula» for real time traffic control

# DPI – datawarehouse



Analyze to identify  
relation between  
UPM and NPM

# High Level Architecture



# SIMULATOR & EMULATOR



# System analysis, dimensioning and support/monitoring of Pilot deployment through

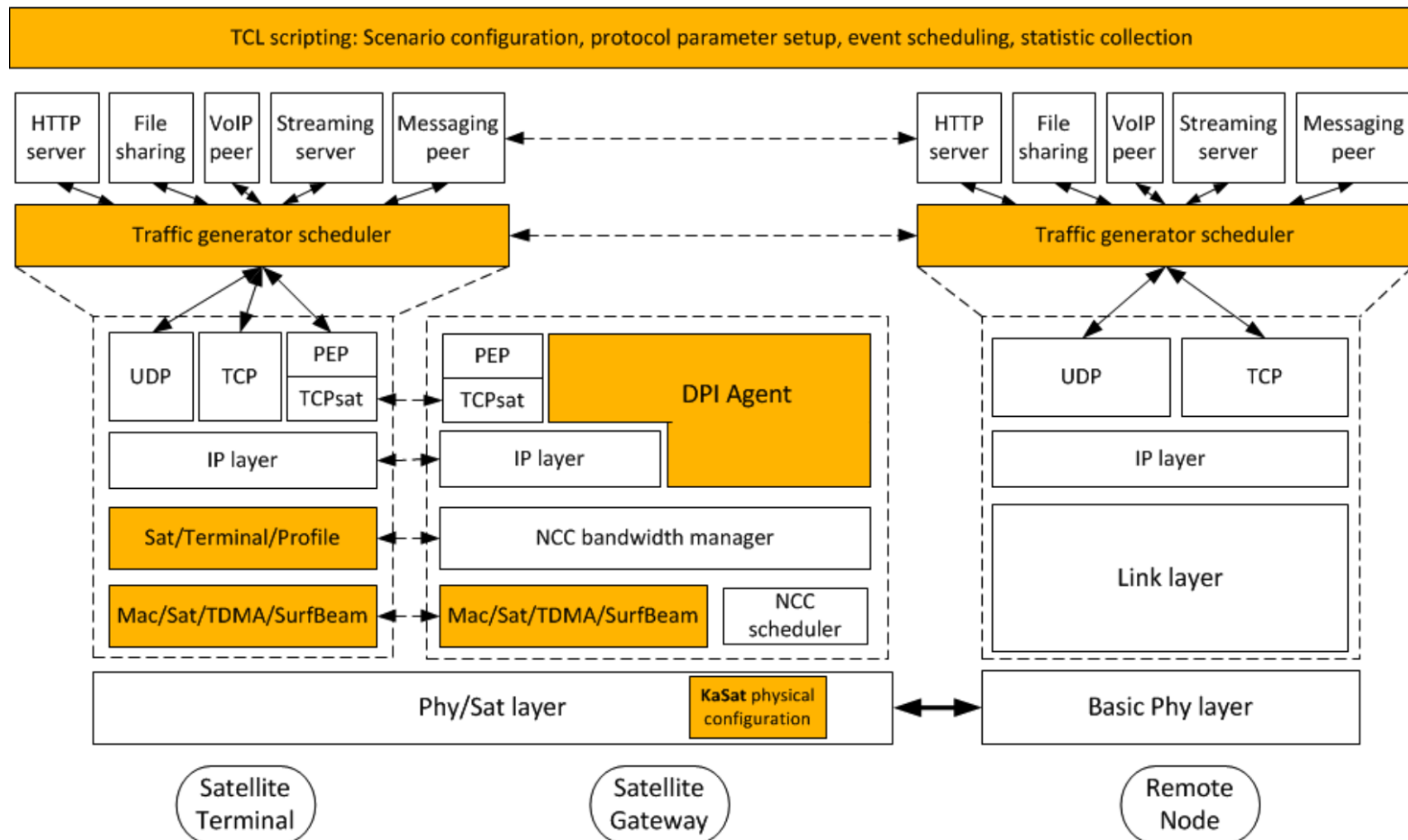
- WP2.2: Definition of Key Performance Indicators
  - User performance
  - Network performance
- WP3.2: Simulation and Emulation of the Network with Traffic
  - Channel utilization
  - Channel partitioning per user type

# Identified KPI

- Network level
  - Evaluation of up and downlink capacity to procure
  - Forecast of traffic increase adding users to the platform
  - Channel Partitioning in different clusters of users (Business, Telemetry, Backup, etc.)
  - Verification of assigned rates and network performance metrics
- User level
  - Running real applications in scenarios similar to those utilized for pilot system
  - User service perception measurement during the day
    - Web browsing experience
    - Youtube streaming
    - Constant Rate guaranteed flows
    - Ping times

# Tools: NS2

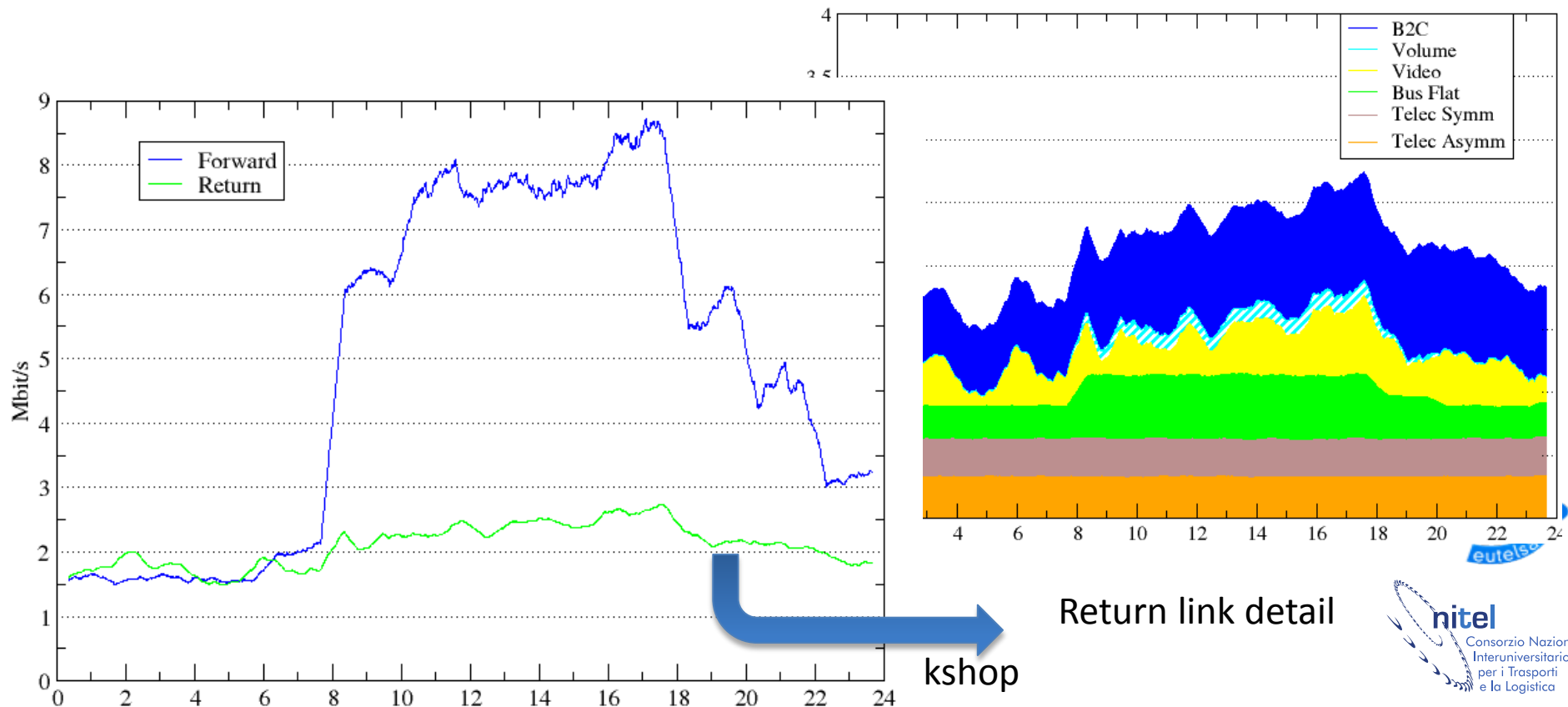
## Simulator architecture





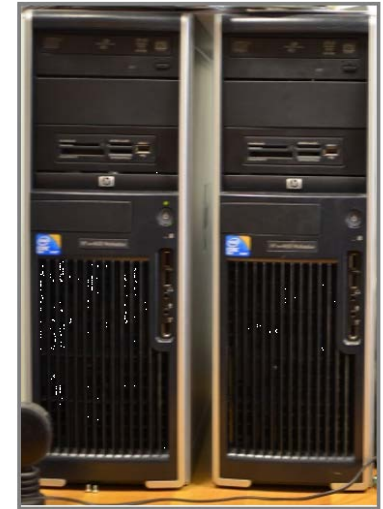
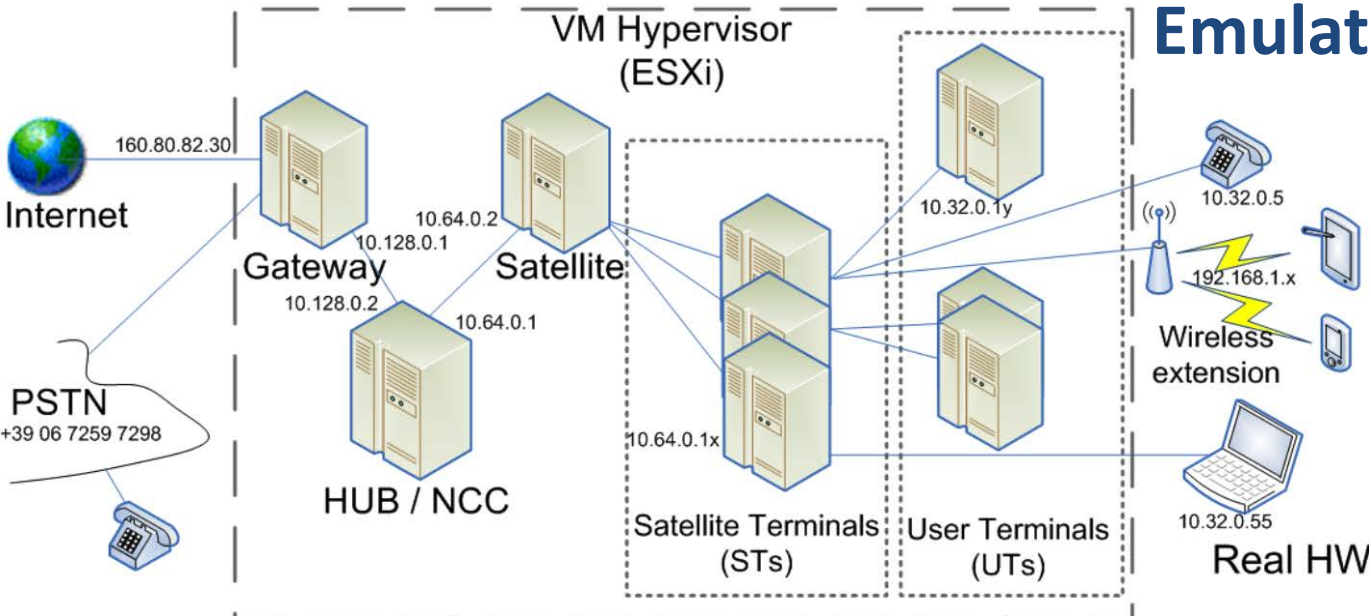
# Channel capacity daily distribution

- Input: real user traffic profiles; number of users 320
- Forecast of real channel utilization (including services partitioning)
- Useful to dimension bandwidth to procure



# Tools: SNEP

## Emulator architecture



## Linux based platform

## Real time operation

## Star/mesh topology

## Centralized control/management

Interfaced with real networks (Internet, WiFi,

## Interconnection with other test beds

## Real traffic test run on demand

## Real application tests

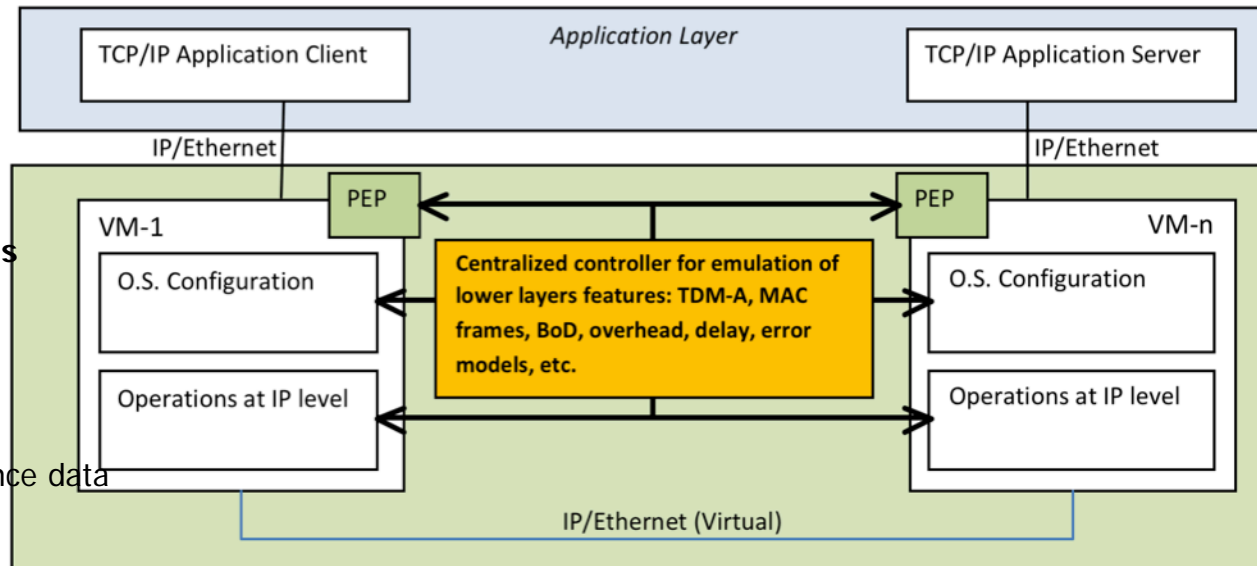
Multiple TCP available, incl. SCPS-TP

Splitting available (PEP w/split arch.)

Real time visual output of test performance data

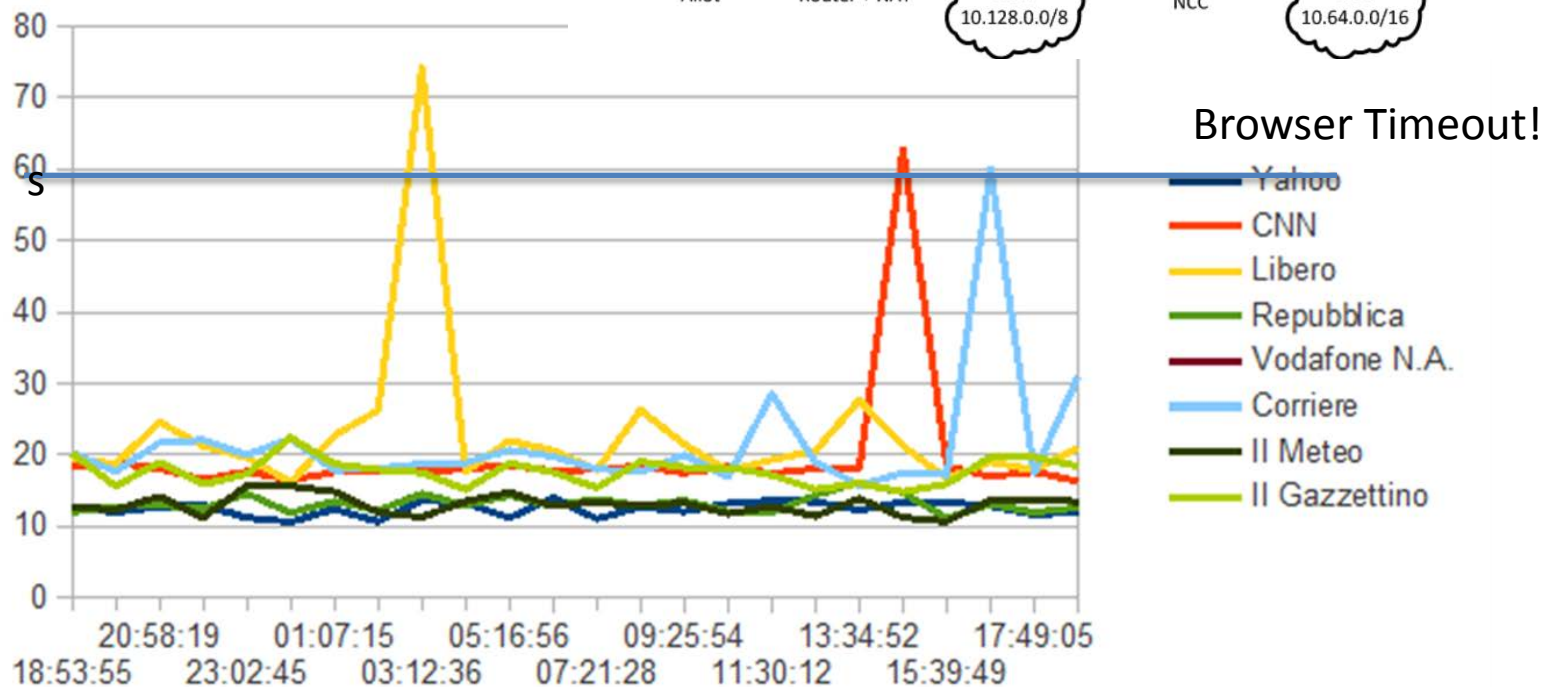
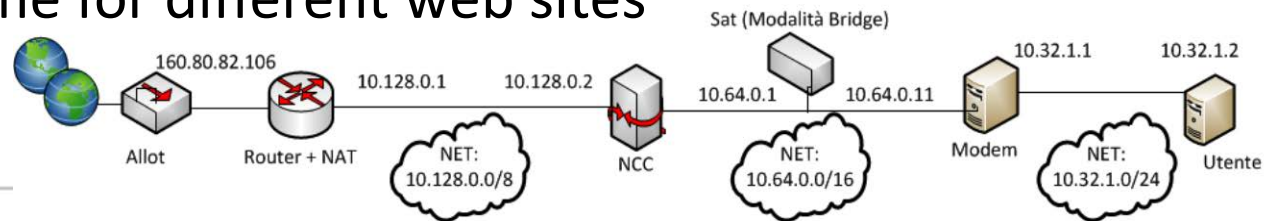
## Hardware in the loop

### Fully accessible via web



# Business Users Web browsing Experience

- Multiple terminals setup
  - more than 15 Virtual Modems to connect PCs compliant to the Tooway system
- Interconnection to real HW for shaping and traffic control (Allot DPI)
- Web page loading time for different web sites

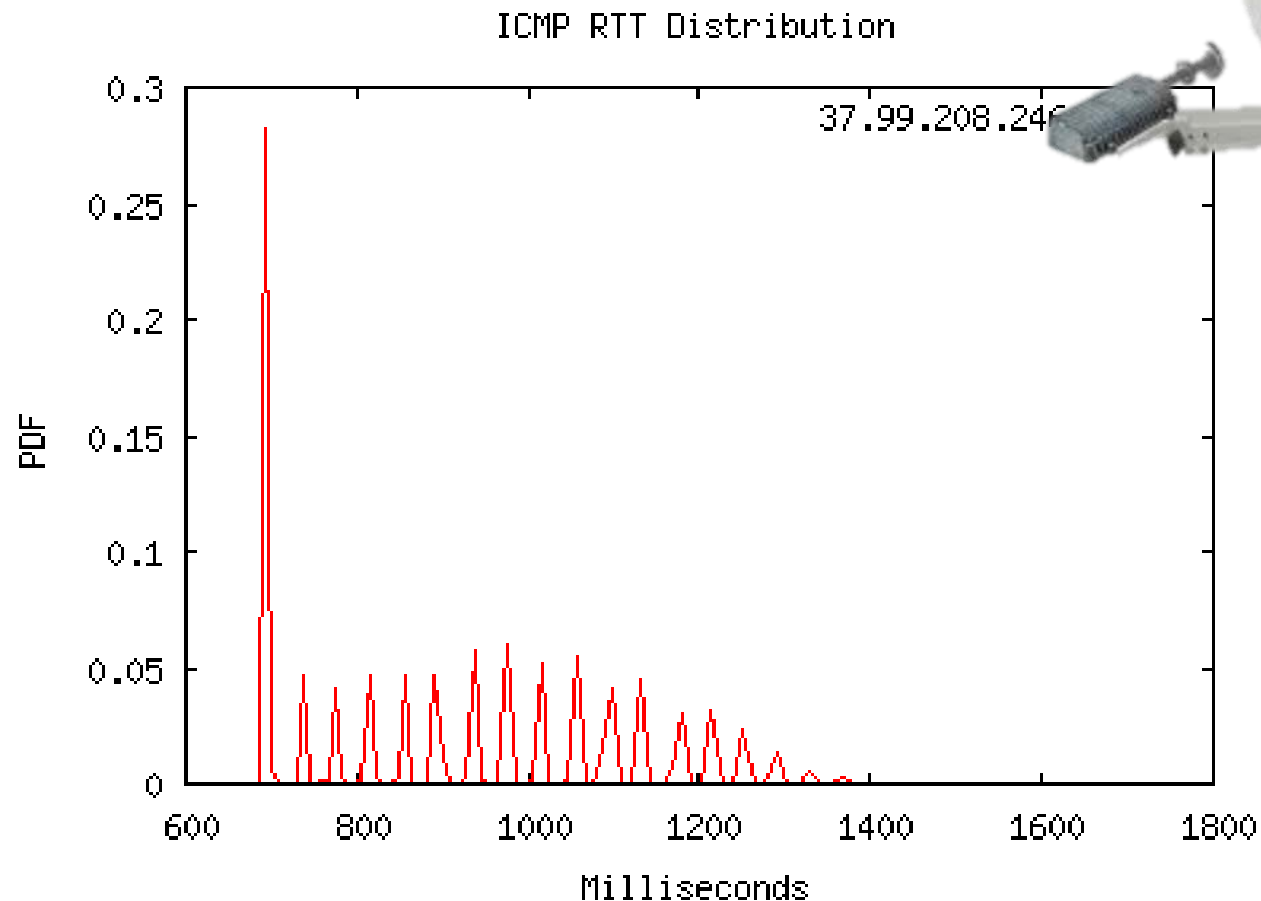


# Real Hardware testing

1. Tooway Kit installed at Nitel Premises
  - Infer lower layers characteristics to validate Simulation and Emulation
  - Measure goodput of target applications
  - Run automated scripts (as on the Emulator) to confirm the models implemented
2. Interconnection of a DPI traffic shaper (the same installed at NOC/NCC) to the Emulator
  - Verify shaping rules
  - Reproducing on the emulator the same rules in software

# Ping times distributions

- Pinged end: Skylogic Gateway



JrfBeam2