

Project Information



Traffic Measurements and Models in Multi-Service Networks

TRAMMS aims to increase the insight in the nature of the data traffic in today's and tomorrow's IP networks. In order to cope with the demands from emerging applications, the architecture of the underlying networks must be laid out with deep knowledge of the applications that are used and the traffic that will be flowing through the networks.

Main focus

The idea behind the concept of a converged infrastructure is that a single network should support (in principle) all applications. It will have to carry traffic from different terminals and a great variety of applications. Traditionally, lack of knowledge regarding traffic patterns in multi-service IP networks has been compensated by massive over-provisioning of resources in order to decrease the likelihood of QoS violations. Understanding the user traffic patterns and how they aggregate on different levels will imply a competitive advantage when deploying broadband networks and applications since the investment costs will be lower.

The main objective of TRAMMS is to model traffic in multi-service IP networks,

and to use the models as input for capacity planning of tomorrow's networks. The models will be built upon data acquired with advanced traffic measurements on the application level with deep packet/deep flow inspection in different parts of Europe, combined with bottleneck analysis and interdomain routing analysis.

Approach

The main goal is to characterise the traffic generated by end-users in fixed access network infrastructures by specifying traffic parameters to be measured and analysed in the different test sites, and to jointly evaluate the results and develop traffic models built upon them. Based on the traffic models, dimensioning rules for capacity planning of IP networks will be created.

To achieve the goals of TRAMMS work will be performed in the following main areas:

- ◆ Traffic measurements in fixed metro/access and wireless access networks.
- ◆ Traffic analysis and models for fixed metro/access and wireless access networks.



TRAMMS

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Partners:

Acreo AB, Sweden

BUTE -Budapest University of Technology & Economics, Hungary

Ericsson AB, Sweden

Euskaltel, Spain

Fundación Robotiker, Spain

GCM Communication Technology, Spain

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- ◆ Broadband bottleneck analysis and capacity planning.

The project will also monitor the behaviour of the routing infrastructure and will correlate the measurements to routing events in order to better understand the impact of service provider maintenance procedures on the experienced QoS. Two bottleneck analysis tools are developed and integrated: NetAuditor (QoS and SLA monitoring) and the Pocket Routing Repository (routing events monitoring). In addition, the available bandwidth monitoring tool, BART, is being developed and validated in the project in several realistic scenarios. Examples of usage for this tool are SLA verification, server selection and Call Admission Control (CAC).

A basis for the project and a particular strength of the consortium is the access to fixed and wireless access networks/test beds with real end-users from which genuine traffic data can be extracted:

- ◆ Acreo National Testbed in Hudiksvall, Sweden
- ◆ RedIRIS network in Spain
- ◆ Spanish operator network
- ◆ Two Swedish municipal networks

Main results

Traffic analysis and traffic models

Parameters such as applications used, trends in application usage, penetration of applications, peak hours, peak rates, traffic volume, uplink/downlink ratios, network traffic locality, service specific user behaviour are analysed at different time scales, and typical user types are defined. The influence on the user behaviour from different first mile technologies is studied as well as the difference in user behaviour between different regions in Europe. The results from the traffic analysis help to improve the PacketLogic deep packet/deep flow inspector product from Procera Networks.

Broadband bottleneck analysis and capacity planning

End-to end measurements will be performed to try to find where the bottlenecks of some typical sessions are to be found. The results from the analysis mentioned in the sections above will serve as input to dimensioning rules for capacity planning.

Tools for network monitoring

Two tools to monitor network status are developed in the project. The Pocket Routing Repository (PPR) performs passive measurements of BGP announcements, and is thus capa-

ble of identifying complex routing events. The analysis of this information will be used to enhance the results of the active probing equipment NetAuditor, even deciding the sample rate dynamically based on the PPR output. Regarding the BART tool, capable of estimating the bandwidth available in real time, standardization activities are being carried out in ITU-T. The tool may also be integrated in other products.

Impact

The results from TRAMMS will bring significant new knowledge in traffic modelling and user behaviour in IP networks. This knowledge is crucial for the future design of European converged networks carrying fixed and wireless services with full support for quality of service. Through the TRAMMS project, European actors will have access to a large base of coordinated measurement data and comprehensive traffic models that will influence architecture and infrastructure design and also improve capacity planning. Results from TRAMMS will pave the way to deployment of "leaner" and more efficient solutions supporting services that the end users will perceive to be of higher quality.

About Celtic

Celtic is a European research and development programme, designed to strengthen Europe's competitiveness in telecommunications through short and medium term collaborative R&D projects. Celtic is currently the only European R&D programme fully dedicated to end-to-end telecommunication solutions.

Timeframe: 8 years, from 2004 to 2011

Clusterbudget: in the range of 1 billion euro, shared between governments and private participants

Participants: small, medium and large companies from telecommunications industry, universities, research institutes, and local authorities from all 35 Eureka countries.

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