Project Information

TRaffic-Aware Networks and Services

TRANS will design, develop and demonstrate a tightly integrated network and service overlay architecture with advanced traffic-aware and self-organisation functionality that will significantly facilitate services ubiquity, while supporting evolved networking business requirements. In particular, a new generation of added value, technology agnostic, VPN services, will be designed. Network elements implementing this functionality will also be designed.

Main focus

The network architecture will include advanced traffic-aware and resources-aware mechanisms as well as related self organization functionality and automatic anomalies detection and diagnostic, introducing a flexible way to control the traffic and to manage the network resources allowing for a cost-effective adaptation to the short-term evolution of the network environment. This functionality will enable new services and new ways to use existing services while also supporting global resources optimisation enabled by the cross-design with the under-laying network data and control planes, and based on the state information exchanged between the network and services overlays.

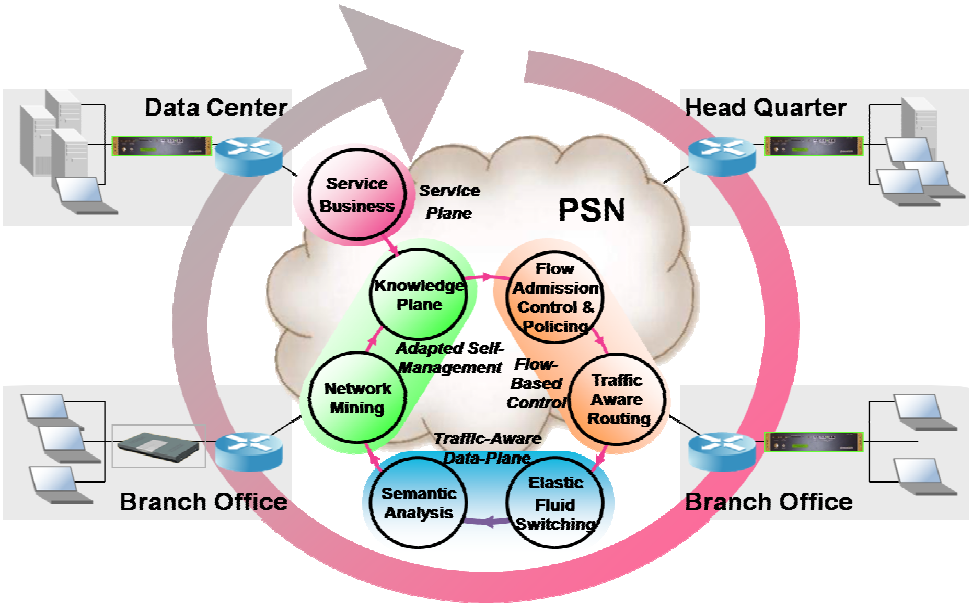
The architecture will specify how the proposed functionality is distributed among the terminals, edge devices and overlays. It will allow ever-complex networks to provide new added-value services.

The architectural concept will be validated in the context of a new generation of Virtual Private Networks, which has been identified as a market requirement by main service providers, the so-called Business-Process-aware VPNs.

Approach

The work starts by identifying requirements for a traffic-aware self-managed solution, defining selected scenarios and the overall architectural approach (network and overlay cross-design).

The overall architecture design will specify the functional blocks in data, control and management planes, both for the network and service/application strata, and the interactions between them.



TRANS

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Partners:

Alcatel-Lucent, France

ENST, France

France Telecom R&D, France

RAD Data Communications, Israel

University of Tessaly, Greece

Universität Würzburg, Germany

Co-ordinator:

Daniel Kofman

RAD Data Communications, Israel

E-mail: Daniel_k@rad.com

Project Website

www.celtic-initiative.org/projects/trans

http://projects.celtic-initiative.org/trans/

The next step is to define the mechanisms that will make the network elements "traffic-aware". This work will be based on the existing Deep Packet Inspection mechanisms as well as on new approaches, based on traffic statistical analysis. An important application of providing traffic-awareness is to detect anomalies within the network and service strata.

The project continues with the design and validation of a specific traffic-aware, self-managing architecture, based on the optimized distribution of advanced algorithms among customer premises equipment, network edge devices and overlays. Previously designed mechanisms for traffic analysis, anomalies detection and network awareness need to be integrated in the global architecture together with the means to aggregate and distribute the monitored information (to build a knowledge plane) and with the distributed decision algorithms. Network elements will also be designed.

The next step is to prove the effectiveness of the mechanisms that have been designed by applying them to new and future-generation Virtual Private Networks. Specific solutions (architectures and equipment) to cover the cases of branches requiring low cost CPEs will be designed, develop and demonstrated.

The final technological step is to validate and demonstrate the solutions designed in the project. The various building blocks will be integrated in a test-bed. The outcome data from the experiments will be analysed in order to quantitatively show the benefits of the proposed solution.

Main results

1. Design and validation of a traffic-aware, self-managing architecture, introducing distributed traffic control and autonomic resource management mechanisms based on the optimized distribution of advanced algorithms among terminals, network edge devices and overlays. The architecture will include traffic-aware functionality for detection of anomalies and diagnostics.
2. Definition of future-generation business-process-aware Virtual Private Networks and demonstration of how the proposed architecture can efficiently support them. The solution will allow for a broad deployment, covering all types of company sites, including small sites requiring low cost customer premises equipment.
3. Joint traffic-aware and resources-aware design of network and overlay topologies for the optimization of various applications, including addressing the questions of routing and dependability, for the support of service provider controlled services.
4. Demonstration of how the traffic-aware and resources-aware functionality can be shared by the different analyzed services over a convergent network for global resources optimization and for significantly reducing management complexity, thereby accelerating the deployment of these evolved services by reducing their complexity.

Impact

The impact of TRANS on enterprises will be at least twofold. On the one hand, the new generation VPN services that will be designed and implemented will better fit enterprises' requirements and completely hide for them the network complexity. These new services, that we called Business-Aware VPN services, are defined in terms of enterprises business process and related users' expected quality of experience. On the other hand, the provided functionality will provide the required vision on resources usage as well as dynamic adaption to current needs leading to resources optimization for cost reduction and better planning of future needs.

Based on these robust self-adapted services, new more efficient business process could be designed and new IT architectures be deployed.

From the operator's viewpoint, the ability to offer business-aware SLAs to enterprise customers will introduce differentiation from competition and larger margins. It will be possible to reduce investment and operational costs through better utilisation of resources and the introduction of automatic, self-configuring mechanisms. New tools for detecting and locating failures and reducing effects of failures will become available.

Manufacturers will be able to develop a new class of solutions and devices able to support the above cited evolutions. Better profitability for operators permits larger margins for manufacturers, a critical issue in a market (networking manufactures) that globally became extremely competitive. This could give European Manufacturers significant competitive advantage.

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.

Celtic Office

c/o Eurescom, Wieblinger Weg 19/4,

69123 Heidelberg, Germany

Phone: +49 6221 989 405, e-mail: office@celtic-initiative.org

www.celtic-initiative.org

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