Project information

Network Management based on distributed paradigms

Madeira

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Partners

Ericsson R&D, Ireland + Sweden

BT Exact, UK

Siemens, Austria

Telefónica I+D, Spain

Soluciones Globales Internet, Spain

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The goal of this project is to develop novel technologies for a vastly distributed and logically meshed network management system that facilitates self-management and dynamic behavior of nodes. This will enable adaptable services and the management of network elements of increasing scale, heterogeneity and transience, thereby reducing operating expense.

new modeling techniques to capture this distribution and its inherent dynamic behavior and to build a prototype system using an appropriate peer-to-peer paradigm.
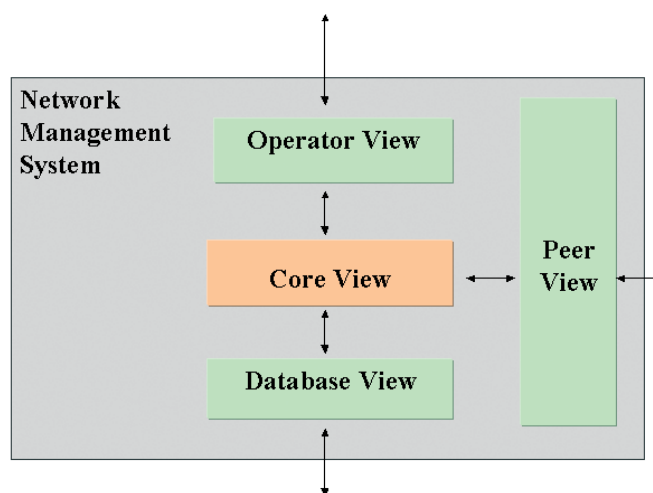
Madeira will provide an innovative architectural framework, requisite interface protocols and a reference software implementation. Madeira will develop a case study focusing on the relationship between fault and configuration management in a dynamically forming network with transient elements from the perspectives of the equipment vendor, the service provider, and the network operator.

Main focus

This project addresses a key issue of telecommunications management: the inability of existing network systems to adapt and evolve towards the service and network system requirements of large-scale ubiquitous networks. Deployed management systems are constrained by rigid standards for interoperable solutions, by static rather than dynamic or self-aware control paradigms, and by rigid architectures that insufficiently allow for flexibility and distribution.

The objective is to investigate large-scale distribution techniques and architectures suitable for network management systems, create

Madeira P2P Network Management system views

Approach

From a scenario of transient meshed multi-access networks, a vertical coverage of network management activities are selected. From this and considering the peer-to-peer paradigms and modeling principles to be evaluated, Madeira will define operator specific requirements, architectural and interface requirements and develop subsequent design iterations.

The project will define the behavior of the elements needed for management and use this to determine the data and interfaces needed. A core aspect of Madeira is the application data modeling and manipulation for a truly distributed management system to capture the behaviour (time sensitive connectivity) of the model or elements of the model making it independent of specific platform or network element implementations. This serves as a basis for developing communication service platforms with integrated management facilities that enable communication applications, services and resources to be used, controlled, operated, administered and maintained in a unified way.

A proof-of-concept prototype identified in the case study concentrates on the functional areas of configuration and fault management and the relationship between them. Differentiation between faulty network behaviour and normal network behaviour for transient or moving elements is an area of particular interest. In this context, it is important to investigate how far the traditional functional decomposition within network management (FCAPS) can be preserved and where redefinitions will be required.

Main results

This project will address the case of a vastly distributed, non-hierarchical, logically meshed peer-to-peer management system for heterogeneous networks and will generate new knowledge and capabilities through publications and demonstrations. It will create an innovative architectural framework, interface protocols, and a reference software implementation. Madeira will make standardization contributions and build a pan-European research laboratory through the integration of shared artifacts and a case study. The project will generate a new set of MDA transformations for dynamically distributed implementations, which allow mapping of configurations to a model without platform specifics.

Specification of the components and interfaces mentioned here is a main goal for the ongoing design activities in Madeira. Further issues to be addressed are the coexistence with legacy network management approaches and how the architecture fits into the TMN e-TOM [5] process framework.

Impact

More and more competitive advantage will not just come from increasing coverage and capacity but from delivering operational excellence in all forms, for example rapid system development and deployment, lower operating costs, and heterogeneous system integration. The Madeira project has the potential to generate enormous competitive advantages not just for the project participants but also for the entire European telecommunications industry, particularly for end-users and customers of the technologies generated in this project. This advantage will be achieved by enabling a robust and more affordable, yet simplified self-managing and scalable distributed network management system.

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 the only European R&D programme fully dedicated to end-to-end telecommunication solutions.

Timeframe: 5 years, from 2004 to 2008

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

Participants: small, medium and large companies from the telecommunications industry, universities, research institutes, and local authorities from 33 countries

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