Intelligent Telecommunication Networks

KIOS
Center for Intelligent Systems & Networks

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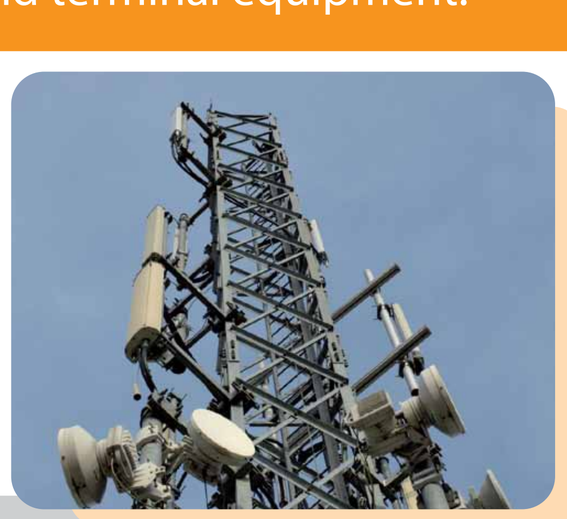
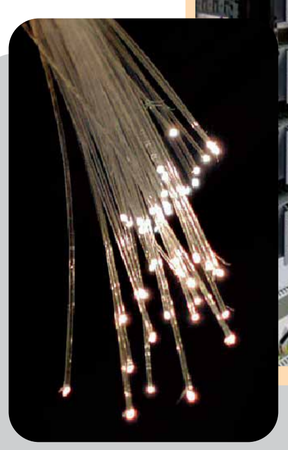
Telecommunication networks have been expanding at a dramatic rate in recent years in order to support the corresponding explosive growth of bandwidth-rich applications. Telecommunication network architectures nowadays provide not only transmission capacities to higher transport levels, but also the intelligence required for efficient connection establishment and failure recovery in order to improve the quality and availability of service.

The applications that are supported in these networks range from plain old telephone service (POTS) to Internet data and business-to-business services. Service providers (carriers) that deploy these intelligent networks are bound to service-level agreements (SLAs) to meet the customers' application needs for good quality service, including functionality, availability and speed, when using the carrier's network.

The most critical SLA involves the availability of the network. Typically a carrier needs to guarantee 99.999% network availability, which is equivalent to less than 5 minutes of allowable downtime per year. However, networks are subject to frequent faults such as cable cuts, switching node malfunctions, etc, either due to accidents, equipment malfunction, human error or even malicious attacks.

Fast, efficient and reliable recovery techniques to enable carriers to provide service guarantees to end users in an uninterrupted manner have become an important requirement for the operation of telecommunication networks. As new services are introduced, the protection of customer services has become increasingly significant, especially in light of frequent failures in the communication links and in the node and terminal equipment.





Research at KIOS:

- Identifying the requirements and characteristics of telecommunication network infrastructures in an effort to better understand these infrastructures and their vulnerabilities
- Identifying and classifying threats and their impacts on these networks
- Designing distributed architectures of intelligent monitoring devices and intelligent agents that are able to monitor on-line the traffic behavior of telecommunication networks in order to detect the presence of faults
- The early detection and identification of faults will assist in the rerouting of communication data through alternate paths in order to enhance the overall availability of the network
- Implementing prototype algorithms based on Artificial Neural Networks (ANN) for fault detection and rerouting
- Developing fault recovery algorithms and mechanisms
- Developing unicast/multicast/groupcast routing algorithms
- Developing impairment-aware routing and protection algorithms
- Developing network control and management structures to implement provisioning and fault management

Collaborators:

- Georgia Institute of Technology, USA
- City University of New York, USA
- University of Patras, Greece
- University of Nicosia, Cyprus
- PrimeTel Plc., Cyprus
- SignalGenerix Inc., Cyprus

www.kios.org.cy

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ΔΙΑΡΘΡΩΤΙΚΑ ΤΑΜΕΙΑ
της Ευρωπαϊκής Ένωσης στην Κύπρο
οι ιδέες μας, πράξη και ανάπτυξη

Ίδρυμα Προώθησης Έρευνας

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