TRONE: Trustworthy and Resilient Operations in a Network Environment

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Motivation

- Technology push:
  - Next Generation Networks (NGN)
  - Need for seamless integration of new and heterogeneous technologies
- Consumer pull:
  - More demanding requirements
  - Increased QoS and QoP: *fast is not enough*
- The challenges:
  - Increased operational risks
  - Inadequate network operation and management

Vision

- Innovative solutions for *Network Operation, Administration and Management* (OAM)
  - *Proactive* hazard reduction: **architectural robustness**
  - *Reactive* hazard reduction: **detection and recovery**
- Achieve **trustworthy network operation**
  - Dynamic Dep & Sec enforcement through:
    - Diagnosis, detection and prevention/tolerance
    - Automatic reconfiguration
  - Self-stabilizing like behavior

Project participants

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Goals

- Enhance network **Quality of Service** (QoS) and **Quality of Protection** (QoP), **operational efficiency** and **agility**
- Deal with increasing levels of **accidental** and **malicious** faults

Means

- **Measures to ensure real-time operational security & dependability**
  - On-line fault/failure diagnosis, detection and prevention, recovery and dynamic adaptation
- **Architectural components & middleware**
  - Network management infrastructure resilient to instability, overload or attack
- **Technology demonstrators & prototypes**
  - Use cases from operator supplied scenarios

Real-time operational Security & Dependability

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- Techniques for on-line fault diagnosis and prediction
  - Meta-models of target infrastructure
  - Metric-based failure predictions and root-cause analysis
  - Black-box diagnosis based on network-level failure prediction
- Automated reconfiguration and adaptation
  - Based on decentralized monitoring and on intrusion-tolerant components
  - Multi-homing for reconfiguration

Network & Systems Management Infrastructure Resilience

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- Architectural solutions
- Resilient communication protocols and middleware
- Plug-in components:
  - Wormhole
  - Secure co-processor
  - Self-healing monitor

Use case scenarios

- Trustworthy IP links connecting large organizations to the open Internet
- New generation BGP/DNS infrastructure
- Trustworthy DMZs for large Data Centers providing cloud services
- Integrated and resilient Network and Security Operation Centers