Active Policy-based Management

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Outline

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- Key Requirements
- Element Management Objectives
- Key Actors in the FAIN Enterprise Model
- EMS Architecture
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- Conclusions and Future Work
- Demo Schedule
The FAIN Project

- 3-year EU co-funded project (IST Program)
- To develop and validate an open, programmable and dependable active network architecture via:
  - active node and management architectures
  - active services: policy-based network management & dynamic provisioning of services
- Compatibility to standards: IETF, IEEE P1520
- http://www.ist-fain.org
Key Requirements

- Active networking presents double impact on network management
  - New management approach: automation
  - New management requirements: dynamism

- Traditional management approaches are insufficient to meet these requirements

- New approach: a fusion of policy-based system and active management
  - Delegation of management
  - Flexibility
Element Management Objectives

- Support of a new Enterprise Model
- Extended Scope of Management by Delegation
- Active Policy-based Management
- Support of Active Service Deployment
Key Actors in the FAIN Enterprise Model

- **Active Network Service Provider (ANSP)**
  - Owns the active network infrastructure.
  - Offers allocation of the underlying resources, Execution Environments (EEs) and their management to SPs

- **Service Provider (SP)**
  - Buys the resources from the ANSP in order to have its own virtual active network, as well as some management functionality.
  - Offers Active VPN services and their management to its customers

- **Customer (C)**
  - Uses and manages the Active VPN service offered by the Service Provider
The Customer obtains the possibility of instantiating the AVPN service between some sites

The ANSP configures its AN to enforce the SLA:
- Configures its AN according to the SLA
- Introduces QoS policies
- Introduces delegation policies

The SP to enforce the SLA:
- Configures its AN to enforce the SLA
- Creates policies allowing the Customer to use the service
- ... and might configure its resources to match the SLA requirements

To reserve resources, the Customer sends active packets with policies to be processed by the SP's service-specific PDP

The policies are forwarded to the element manager

The element manager certifies that the SP is allowed to use its own service-specific PDP
- Downloads the PDP, and hands it the policies to decide on the Customer's reservation request

The same process is repeated along the route

The SP obtains:
- A virtual active network
- Access to EEs with certain resources
- Management functionality to manage his allocated resources
SP-ANSP SLA Enforcement

- The SP first negotiates a SLA with the ANSP to obtain:
  - A virtual active network
  - Access to EEs with certain resources
  - Management functionality to manage his allocated resources

- The ANSP configures its active network to meet the SLA requirements with the SP
  - Introduces QoS policies to allocate the resources to the SP.
  - Introduces delegation policies to allow the SP to access the delegated management functionality
C-SP SLA Enforcement

- The Customer negotiates a SLA with the SP in order to be able to instantiate the AVPN service between some sites.

- The SP to enforce the SLA:
  - Creates policies allowing the Customer the use of the service with the agreed resources.
  - The SP might also configure its resources using the delegated management functionality from the ANSP management system.
Customer Reservation

- To reserve resources, the Customer sends active packets with policies to be processed by the SP’s service-specific PDP.

- The policies are forwarded to the element manager (owned by the ANSP) to be processed.

- The element manager certifies that the SP is allowed to use its own service-specific PDP.

- Element manager downloads the PDP, and hands it the policies to decide on the Customer’s reservation request.
Delegation of management functionality
- SP’s access to ANSP management functionality (within the node and the element manager)
- SP may use own code to manage allocated resources in order to offer service

Active Policy-based Management
- Policies are carried by active packets
- Dynamic downloading of service-specific PDPs
- Migration of PEPs to EEs for increased efficiency

The use of XML to express policies
- Built-in policy syntax checking
- Portability between heterogeneous platforms
Conclusions and Future Work

- The demo represents an initial proof of concept of the management architecture developed by FAIN.
- The architecture aims to achieve a synergy between active networking and policy-based network management technologies.
- Integrated of the management system with the FAIN Active Node currently under development.
- Enhance demo functionality.
- The monitoring system and active service deployment in correlation with the rest of the policy system has to be introduced.
- Most of the policy processing logic will be realised within the next period of work.
- Policy-based management domains.
Thank you for your attention