Multiservice Access Network with Distributed Service Enablers

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Overview

Introduction

A New Service Rich Access Architecture
- Added Values
- Example: Session Border Control Service

Analyse the impact on Access Multiplexer Equipment
- New Requirements

Service Plane: A new Conceptual layer
- Distributed Service Hooks
- Middleware Software Platform

Conclusions & Further work
Introduction: Today's Access Network Architectures

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Introduction: Evolution in Access Networks

> Evolution towards higher bandwidths on the access link
  ■ New High BW xDSL flavours (<100 Mbps)
    e.g. ADSL2+, VDSL2,…
  ■ Optical Access (>100 Mbps)
    e.g. FTTN, GPON, FTTH,…

> Evolution toward mass-scale deployment of IP Services
  ■ POTS → IMS – TISPAN
  ■ CATV → IPTV deployments
A New Service Rich Access Network with distributed Service Enablers
Added Value of the new Architecture

Improved Scalability
- Higher Bandwidths
- Number of Users

Full micro-flow control possible
- Application-level wholesaling

Improved Resource Management
- Full visibility on the network traffic & resources per user
- Resource management across different services (VoIP, IPTV, Gaming,…)  

Improved Robustness
- Reduced number of impacted users during single hardware failure

Strategic Location inside the first trusted network element:
- Hosted Security functions: (D)DoS, Worms
- Location based services
- Legal intercept
Examples of Service Enablers

> Session Control for Voice/Video Conversational Services

- Rate-limiting / Accounting
- Resource Admission Control
- QoS tagging & monitoring
- NAPT
- Security of signalling traffic
- Legal Intercept

> Other Services (*)

- Time-shifted TV caching
- TCP Acceleration function

(*) E. Gilon, et al. Demonstration of an IP Aware Multi-Service Access Network, BroadBand Europe 2005
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Conclusions & Further work
Requirements on hardware

> Data-Plane hardware
  - L3-L7 Packet processing
    - E.g. Deep Packet Inspection
  - Wire-rate processing
    ➔ More powerful packet processors

> Control-Plane hardware
  - Higher layer re-assembling & Interactions
    - E.g. SIP, HTTP, XML/SOAP interactions
  - Flexibility
    ➔ State-of-the-art Communication processors
Requirements on System Architecture
- Cost of equipment (CAPEX)
- Combine existing processing power with modular hardware add-on
- Distributed or Centralized in the network equipment

Requirements on Service Management
- Operational Expenditure of the operator (OPEX)
- Middleware Software layer
- Host simultaneously multiple service enablers
- Independent life-cycle management (monitoring, upgrading, …)
Service Plane: A new Conceptual Layer

Service Plane

Control Plane (SW)

Data Plane (HW)

Service Rich NT

Service Blade

OR

Service Rich LTs

Service A

Service B

Service C

Service Hooks
Distributed Service Hooks

Data-Plane Service Hooks
- Packet Classification
- Packet Manipulation (QoS tagging, NAPT,…)
- Mechanism to perform packet actions across different blades:
  - Packet transport
  - Meta-Data transport

Control-Plane Service Hooks
- Synchronisation of control-plane information
- Static Configurations: Edge Routers, …
- Dynamic configurations: VLAN, IP, VRF, …
- Event-Mechanism: QoS Profile updates, …
Middleware Software Platform

Network Termination & Packet Handling
- Terminating Ethernet/IP Traffic
- Interactions with Data-Plane Service Hooks
- Additional Packet Manipulations

Communication
- Synchronisation middleware platform with user & network settings

Service Management
- Management of the Services
- Life-cycle management
- Recovery from failures
Conclusions & Further Work

Conclusions

- New Architecture with distributed service intelligence
  - Scalability / Robustness / Quality / Security
- Impact on the Access Multiplexer was analysed
- Service Plane solution was proposed to solve requirements
  - Technical
  - Economical
- Implementation & Demonstration within the IST-MUSE project

Further work

- The Distributed SBC service will be worked out further
- Further research on other Service Enablers
Thank you for the attention

Do you have any questions?

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