ScaleNet – Converged Network of the Future

ComNets Workshop 2008,
Dr. Bangnan Xu, T-Systems
What is the deciding factors for the success of networking technologies?

- Simple
- Cheap
- Open

WLAN vs. W-CHAMB
IP vs. ATM
What is the key features of the future networks?

- Broadband
- Mobility
- NG(M)N
- FMC
ScaleNet.
BMBF funded research project.

DTAG ScaleNet team

DT- Labs
T-Systems
Fixed access network technologies
Mobile & Wireless solutions

ScaleNet partners

Time plan

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<tr>
<th>Q3</th>
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Agenda.

- Introduction
- Converged NG(M)N enabled network architecture – Motivations
- Concepts for a converged network of the future
  - Common infrastructure for NGN and NGMN
  - Unified service control platform
  - Overarching network functions
- The ScaleNet integrated demonstrator – Prototypical implementation
- Conclusions
ScaleNet architecture - Motivations
Converged network and service

Motivations:
- CAPEX/OPEX reduction.
- Easy & quick introduction of new services.
- Optimised quality of experience
  - Seamless services
  - Self-configuration
  - Dynamic QoS
Next generation mobile networks.


- Key targets:
  - Decreasing the number of nodes
  - Reduced cost per bit (close to xDSL costs), increased service provisioning
  - Flexibility of use of existing and new frequency bands, simplified architecture, open interfaces
  - Peak data rate: 100 Mbit/s (downlink) and 50 Mbit/s (uplink)
  - Channel bandwidth variability: 1.25 - 20 MHz
  - Roundtrip latency time: < 10 ms (core), < 10 ms (RAN), < 30 ms e2e
Common infrastructure for NGN and NGMN

ScaleNet vision

- aGW functionality is integrated in Access border controller (ABC) and edge router (ER)
Converged service control platform.
From “stovepipe” to an unified production.

From “Stovepipe” per service ...

...to an open standardized layered architecture

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Converged service control platform
IMS as the uniform service control platform

Functions for converged IP Multimedia - services control and media delivery

- Standardized interfaces for easy and fast service creation and delivery
- Reusable service enablers, capabilities and control mechanisms for converged services
- Enhancements to support IMS based IPTV services
- Support of content adaptation, distribution and multi-path media delivery

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Overarching network functions

Service aware networking

1. Best service quality in case of sufficient network resources.
2. Disturbed service quality in case of insufficient network resources.
3. Service quality is adapted to the available network resources.

Bottleneck requires dynamic resource and admission control
Dynamic resource control for more efficiency
Overarching network functions

DARMF – An example

1. DARMF evaluates current channel situation of wireless connection.
2. DARMF informs A-RACF about any change of the resource situation.
3. Feedback to application function about changing QoS situation.
4. Adaptation of session parameters.
5. Session continuation with adapted session parameters.
The ScaleNet integrated demonstrator
Prototype of Network of the Future

AS
IMS
HSS
S-CSCF
P-CSCF
I-CSCF
SPDF
AS/IMS
ALU/DTAG/ericsson

CAAN
NGN enabled converged aggregation access network (CAAN)

EIBONE

MM/GMI/AAAC
NSN/DTAG

OverSim/P2PSIP
Uni Karlsruhe

BS
New Radio

MIMO-OFDMA
NSN

HAM
BSS

3G/4G
Radio
BSR

Mesh

WiMAX

GPON

Mesh/WiMAX/GPON
DTAG

ALU: Alcatel Lucent, NSN: Nokia Siemens Networks, DTAG: Deutsche Telekom
DTAG ScaleNet demonstrator setup

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DTAG ScaleNet@campus
Validation in a real environment
## Conclusions

### Concepts for a converged network of the future

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<tr>
<th>Common infrastructure for NGN and NGMN</th>
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<tbody>
<tr>
<td>- ABC – Access border controller with aGW (access gateway) functions</td>
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<td>- UAN – Unified access node to integrate existing and emerging heterogeneous access technologies</td>
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<th>Unified service control platform</th>
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<tr>
<td>- Unified service control platform for easy and quick service introduction</td>
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<td>- Dynamic interaction between service and network – service aware networking</td>
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<td>- Dynamic resource management with optimized quality of experience</td>
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<td>- Overarching network functions for Mobility, QoS and AAAS</td>
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Thank you for your attention!

Any questions?