Network Technology R&D Program - Overview 2012.
Motivation for Network Technology R&D
DT Network Technology R&D in Innovation Environment.
R&D extends DT’s view on innovation by scouting and assessment of technology options.

**Deutsche Telekom R&D**

**Managing increasing degree of**
- technology options under consideration
- anticipated period

**......by making use of**
- external (vendors and internat. R&D projects) and
- internal know how.
Objectives of Network Technology R&D.
R&D portfolio and project contributions to be relevant.

- R&D project portfolio addresses technology innovations of various maturity levels, in order to identify and determine their relevance for Deutsche Telekom, by:
  - scouting and initial assessment of new technology developments
  - techno-economic assessment of technology options and providing guidance on their strategic implications
  - Nurturing, developing and shaping innovations with vendors in pre-commercial phase

- Individual R&D projects contribute to overall R&D portfolio

- Governance process and stakeholder involvement on project level ensures relevance of
  - entire R&D portfolio
  - individual project results and transfer

Network Technology R&D Program
Network Technology R&D Program Overview.
Projects Running in 2012.
Technology Sector “Access”.

- **Multi-layer LTE Network Architecture** (06/09 – 06/12)
  capacity and coverage optimization by multi-layer LTE networks and field trial Pico4Real at outdoor DSLAM locations

- **Convergent Heterogeneous Mobile Networks (C’MON)** (09/12 – 12/13)
  Performance and techno-economic analysis of advanced HetNets concepts.

- **Mobile communication Enablers for 2020 (METIS)** (11/12 – 04/15)
  EU-funded project exploring technology developments towards “5G” mobile networks.

- **Broadband for Planes** (03/09 – 03/12)
  system concept, regulatory framework and field trial for Direct Air-to-Ground Communication for aircraft based on LTE (with Airbus, ALU)

- **Next Generation Optical Access** (05/2009 – 12/2013)
  beyond GPON: technology analysis, techno-economic impact and vendor HW tests

- **Next Generation Fiber-to-the-Building (G.fast)** (01/2012 – 12/2013)
  close the gap between the fiber access technology and the copper in-house network

- **Broadband Access Partnering Models** (05/2011 – 04/2013)
  tools and methods to evaluate cooperation and competition models for FTTH and DSL rollout
Technology Sector “Transport Infrastructure”.

- **Open Flow in Europe (01/2010 – 12/2012)**
  analysis of Open Flow and split architecture with regard to carrier class requirements and validation in experimental facility

- **Programmable Access Control (ProAct) (01/2012 – 12/2013)**
  OpenFlow-based soft-BNG network element based on ATCA-hardware

- **Optical Packet Integration (ORION) (01/2012-12/2013)**
  integration of optical functions into router interfaces (incl. linecards and buffer optimization)

- **TeraStream Advanced Lab (07/2012 – 06/2014)**
  laboratory infrastructure for implementation and tests of alternative TeraStream functions, e.g. stateless IPv6

- **IP Packet and Flow Level Measurements (06/2011 – 05/2013)**
  traffic statistics of real network, in Berlin and Frankfurt

- **TeraWave Communication (05/2011 – 04/2012)**
  assess applicability of 300GHz-3THz spectrum for communications
Technology Sector “Service Layer”.

- **Wholesale QoS Interconnection** (01/2010 – 12/2013)
  control for QoS-based interconnection models between operator domains and trials (recipient: Wholesale)

- **Cloud Service Acceleration** (05/2011 – 04/2012)
  performance improvement tools to either SME content providers, hosting providers or end users

- **Content Delivery Network (CDN)** (11/11 – 10/12)
  CDN services, architectures & implementation
Technology Sector “Terminals & Application Environments”

Terminals & Application Environments

- **webinos** (07/2010 – 09/2013)
  Enablers for future WebOS to drive portability and secure use of web applications across mobile/fix/TV/automotive terminal platforms

- **TV-Model transfer** (02/2011 – 07/2012)
  Prototyping and transfer of project results to standardization bodies: methods for quality assessment of multimedia streaming

- **QoS@home** (07/2011 – 07/2012)
  End-to-end Quality of Service assurance incl. different home network segments

- **Integrated Access for Residential Customers (INAR)** (06/12 – 11/13)
  Customer experience will be increased by adding mobile access as “booster” for DSL

- **IPv6-only Access/HG** (12/2011 – 09/2012)
  IPv6 home gateway complying to TeraStream architecture
Technology Sector “Architecture & Energy Efficiency”.

- Load Adaptive Networks and LANs (10/2010 – 10/2012) concepts for operation of load-adaptive carrier and enterprise networks to limit energy consumption and costs
- E2E Load adaptive ICT network (DESI) (06/2011 – 05/2014) DT UPS-plants’ contribution to load adaptive operation of carrier network by electrical power storage/buffering
- Smart Sub-Grid DTAG (03/2010 – 05/2012) proof of economic viability of management of DTAG battery parks
- Intelligent Access 2.5 (01/2010 – 02/2013) energy efficiency in RAN by aware management of access.
- Distributed Storage Optimization (09/2010 – 09/2012) planning and designing efficient storage distribution for P&I services
- NG Data center (Odyssey) (10/2011 – 03/2013) simplify datacenter networks using software-defined networking and allow improved mgmt and provisioning functions
- Aggregation and Resilience cost optimization (Agricola2) Optimization of the number sites according to the current fiber rollout-strategy
Technology Sector “OSS”.

- **Concept for new OSS production models** (07/2012 – 11/2012)
  Recommendation of new production models per OSS cluster, taking into account OSS architectural, operational and network dependencies

- **OSS Cockpit** (08/2012 – 12/2012)
  Definition of new KPI models for investments in OSS landscape

- **Extend Common Component Design Demonstrator** (05/2012 – 12/2012)
  Concrete OSS implementations are investigated and modules as candidates for potential reuse are implemented according to the CCDD principles

- **NGOSS – Common Component Library Structure** (09/2012-12/2012)
  Define and Develop an OSS Library Structure for Common Components in OSS

- **Performance Management Consolidation Concept** (06/2012 – 12/2012)
  Definition of DT group wide standard for end-to-end resource performance management (RPM) over all NGN planes in an All IP fixed/mobile converged environment