CELTIC
Telecommunication Solutions

R2D2 NETWORKS

EUREKA

R2D2 Networks

Towards QoE-driven self-adaptive networks

Seminar June 29th Oslo

GOBIERNO DE ESPAÑA
MINISTERIO DE INDUSTRIA, TURISMO Y COMERCIO
plan avanza2

Unión Europea
Fondo Europeo de Desarrollo Regional

The Research Council of Norway

VINNOVA

Project Description I

- **Roadmap to Next Generation Networks**
  - ✓ Media Aware
  - ✓ User-Dependent
  - ✓ Self-Adaptive

- **Motivation:**
  - ✓ QoS for services/contents can not be dynamically controlled by involved actors
    - ✓ Network Operators
    - ✓ End Users/Subscribers
    - ✓ Content Providers
  - ✓ Best Effort Strategy
    - ✓ QoE decrease/loss in case of congestion

Project Description II

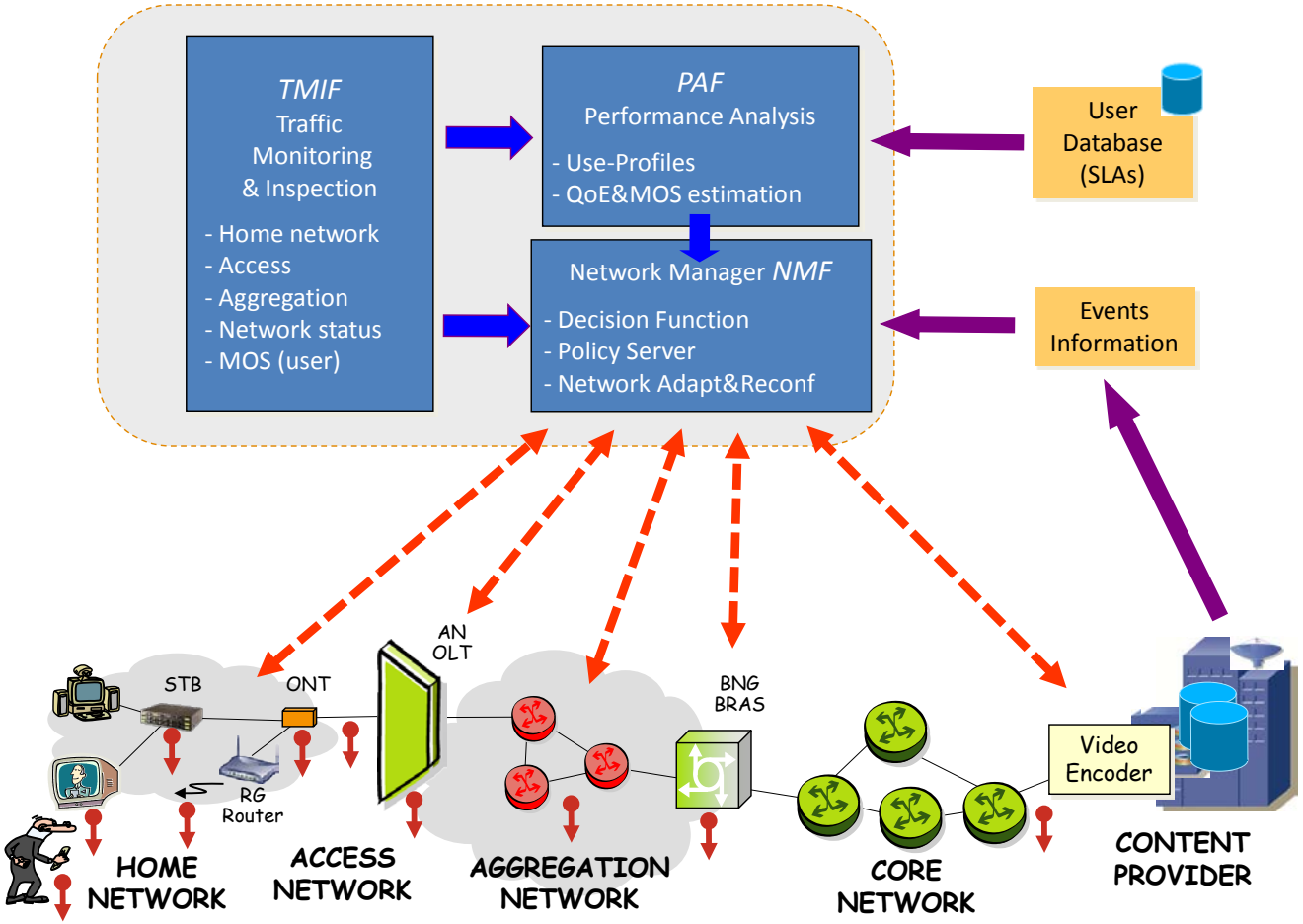
- **Requirements:**
  - ✓ On Demand Network Resources
    - ✓ according to services/contents
  - ✓ By Network Monitoring of QoS and QoE
    - ✓ Access, distribution, home network.
  - ✓ And User behaviour patterns/feedback on QoE
  - ✓ To decide where and who is to adopt corrective measures

- **Goals: Network Resource Manager(NRM)**
  - ✓ Dynamical Optimisation of QoS parameters
    - ✓ without static provisioning
  - ✓ Monitoring of network state
    - ✓ Access, distribution, home network
  - ✓ Feedback from users' experienced QoE
  - ✓ Heterogeneous access technologies
    - ✓ WiFi, Fiber, ADSL

Partners

Company name	Abbreviation	Role	Country	Type
Telefónica I+D	TID	Project Coordinator/WP Leader/Task Leader	Spain	Telecom Operator
CTTC	CTT		Spain	Technological Centre
Ericsson AB	EAB		Sweden	Industry
IKUSI	IKU	Task Leader	Spain	Industry
Lund University	LTH	Task Leader	Sweden	University
Tecnalia	ROB	WP Leader/Task Leader	Spain	Technological Centre
SINTEF	SIN	WP Leader/Task Leader	Norway	Technological Centre
Telnet-RI	TEL	WP Leader/Task Leader	Spain	Industry
Uninett	UNI		Norway	Telecom Operator

System Architecture I: Overall View



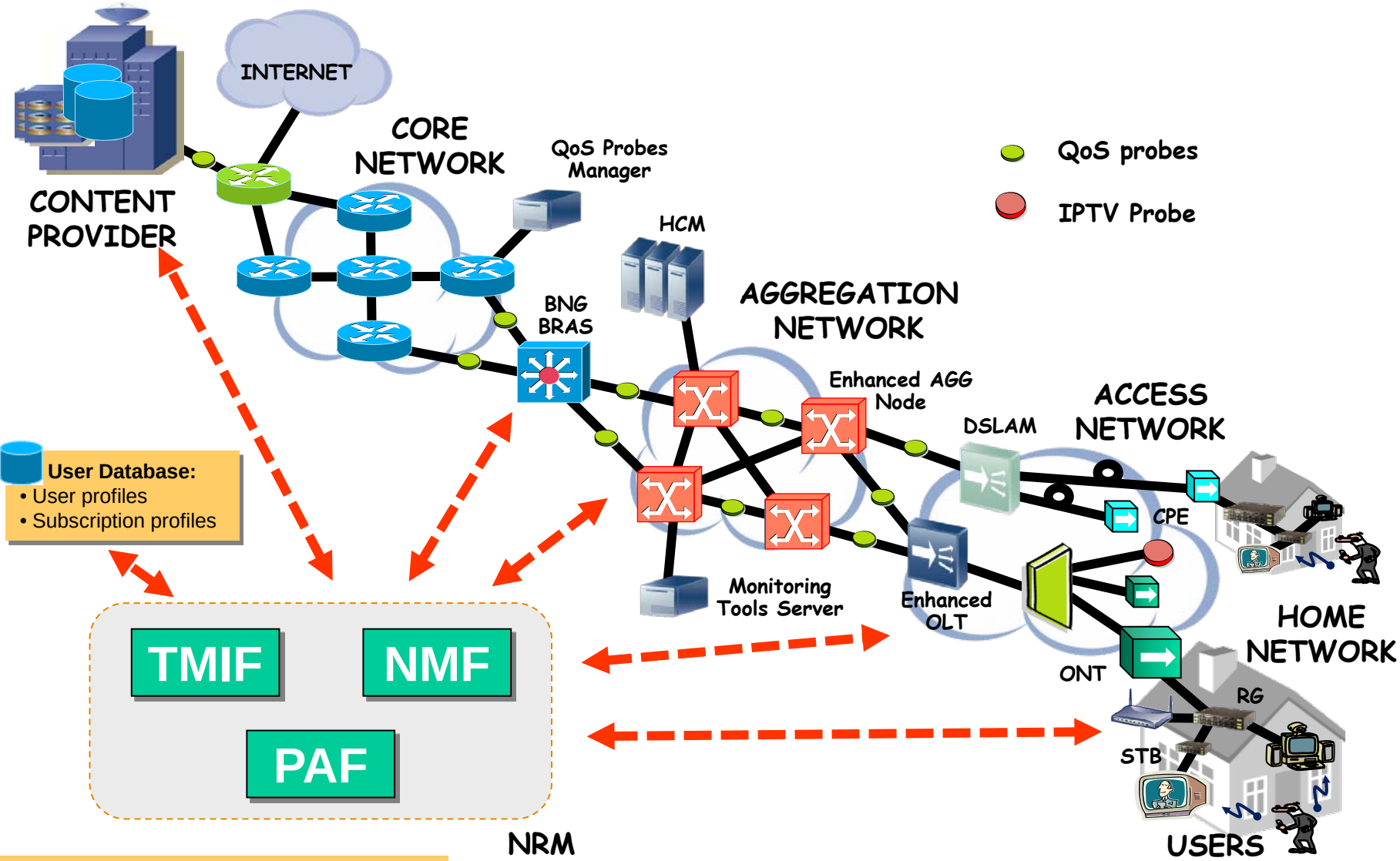
System Architecture II

- Gathering of users' perceived QoE in real time
- Deployment of Network Status Monitoring points
  - ✓ Home Network
  - ✓ Access Network
  - ✓ Aggregation Networks
- Content Information from Providers

System Architecture III: NRM

- **TMIF (Traffic and Monitoring Inspection)**
  - ✓ Gathering of users' QoE in real time.
  - ✓ Gathering and assessment of QoS info collected by probes
- **PAF (Performance Analysis Function)**
  - ✓ Estimate QoE from TMIF input
  - ✓ Comparison against unified User Profile (including SLA-Service Level Agreement)
- **NMF (Network Management Function)**
  - ✓ Acts if *estimated QoE is not the desired one according to PAF*
  - ✓ Contact Network Elements in order to apply required policies
  - ✓ Self adaptive factor of the equation
- **Gathering of Users' perceived QoE in real time,**
  - ✓ Corrective mechanism, if *QoE estimated from QoS differs from gathered one*
  - ✓ Users feedback on QoE and User Profiles
  - ✓ User dependant factor of the equation
- **Collection of Media Info from content Providers**
  - ✓ Pre-emptive measures to ensure QoE/QoS for highly demanded contents
  - ✓ Content aware factor of the equation

Intended Final R2D2 Testbed I



Intended Final R2D2 Testbed II

- **NRM as system kernel**
- **IPTV probe**
  - ✓ **IPTV QoE monitoring in the GPON access network**
- **Enhanced OLT**
  - ✓ **Optimum use of upstream capacity**
- **Enhanced Aggregation Node**
  - ✓ **Dynamic reconfiguration mechanisms for the downstream traffic**
- **QoS Probes**
  - ✓ **Network parameters monitoring in every Segment**
- **QoE Prepared STB/RG**
- **HCM (Home Configuration Manager)**
  - **Remote Management of CPE configurations**
- **BRAS with control interface to NRM**