Control plane uses for content delivery in future networks

Madrid, November 2011

TELEFÓNICA I+D

Telefonica

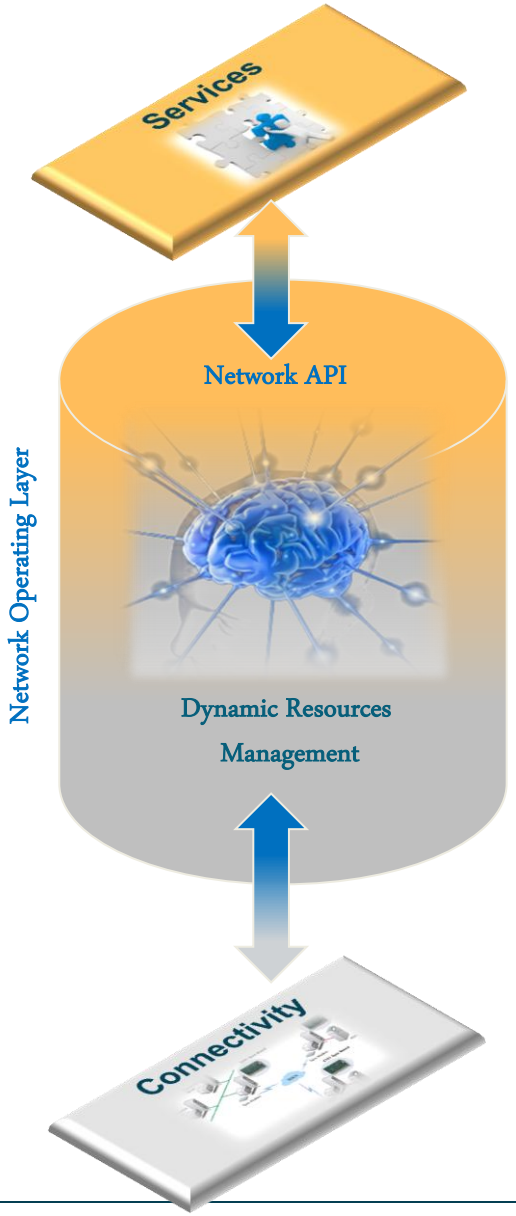
01

Introduction

Network Intelligence (NI). Introduction

'Network Intelligence' discussion comprises three different technological trends, which are loosely coupled

1. **Auto-configuration & Flexible network**
   - Plug & Play nodes, Seamless E2E MPLS, CCN-like auto-discovery, DHCP extensions, BGP support to self-discovery...
2. **Dynamic Resource management**
   - Signalling & Enforcement: PCRF, IP Edge enforcement, MBB CoS, DPI-based enforcement...
3. **Adaptation to services: Simple Network API**
   - Connectivity API: Information interfaces and requests (profiles with BW, QoS, latency...)
   - Specialised APIs: Content-Aware Network / NG-CDN

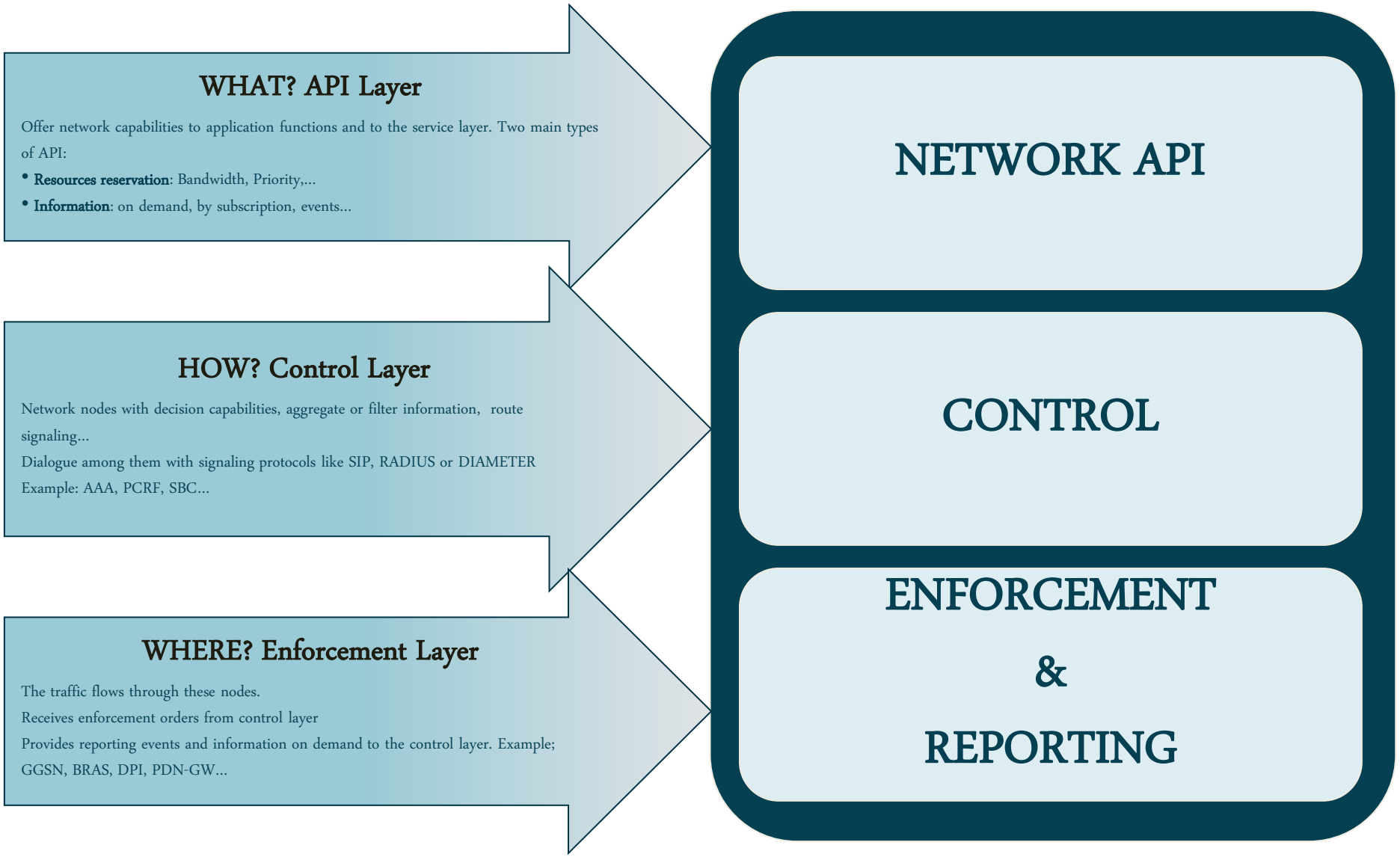


In our WG we are working mainly in two of them with these objectives:

- ✓ To obtain real time information about network state for Services & Apps
- ✓ The management of network resources in real time
- ✓ To improve the network efficiency

… will drive to operator's services one step ahead

Network Intelligence (NI). Concept



Network Intelligence (NI). Main actors

Online Charging (OCS) in order to apply real time charging capabilities in a convergent fashion fixed mobile, post-paid & pre-paid. This allows charging based on any type of events.

Unified database (UDB). Consolidated network database including user identifiers, service profiles, and access types.

Policy Control. Rules logic to be sent to the different Policy Enforcement points in order to apply control traffic flow on the network.

Policy Enforcement Point (PEP). Applies rules on data flow in order to achieve capabilities such as packet counting, QoS, BW, intelligent routing...

Radius: Perform Authentication and Authorization but it takes Policy Enforcement management roles too.

DPI. Traffic detection function, Protocol & Application/service identification based on signatures & behavior. May act as PEP or only as a reporter.

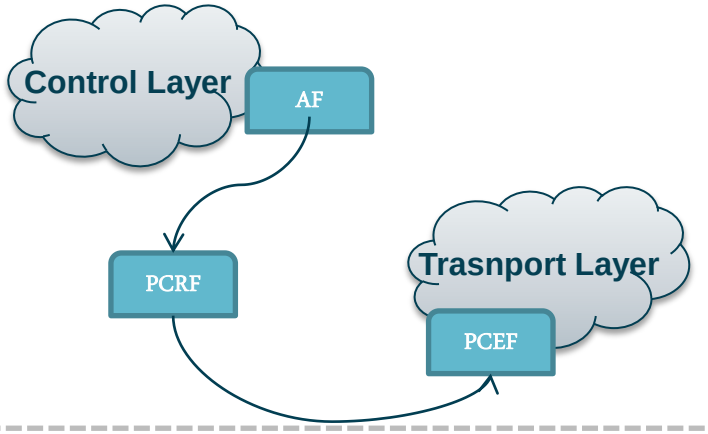
Inline applications. Applications using data flows in order to offer services such as Video or Web optimization, Parental control, mail fishing, QoE analysis etc...

02

Standardization Groups and forums

NI: Based on Standardized Architectures

Approaches from different organisms:

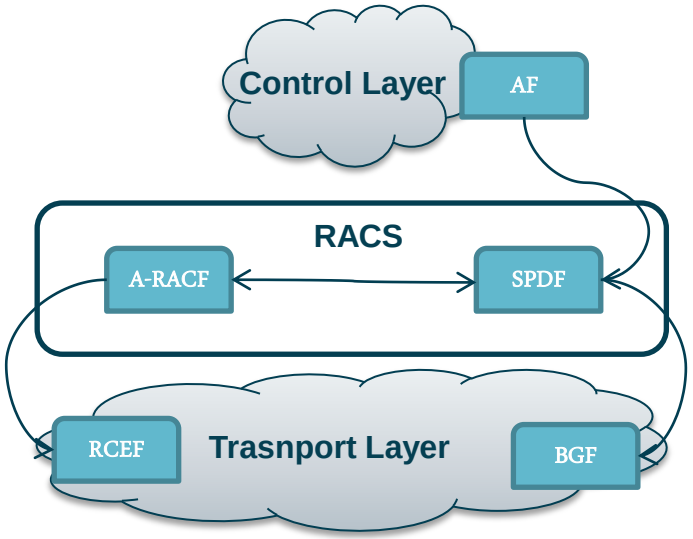


3GPP A GLOBAL INITIATIVE

TS, 23.203: Policy and Charging Control Architecture

tispan

282-003: Resource admission Control Subsystem

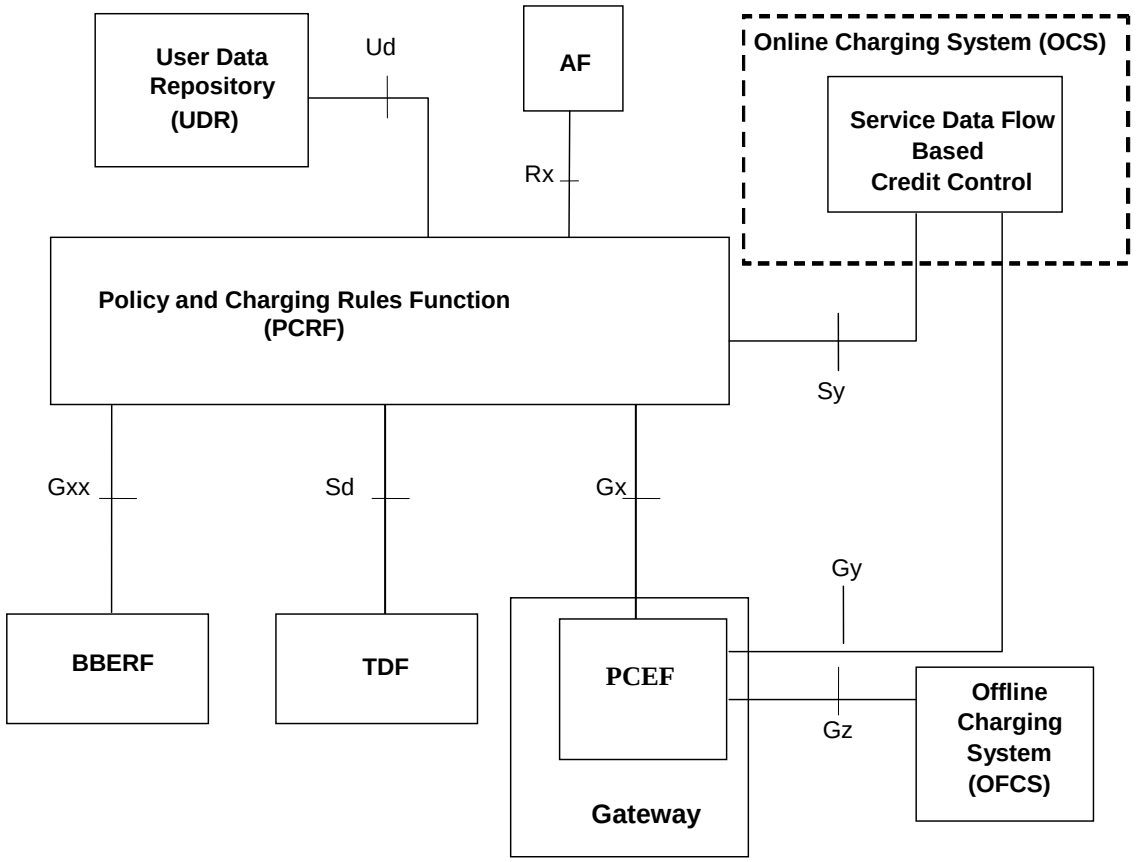


broadband forum

Operations & Policy Control

The 3GGP Architecture, the starting point

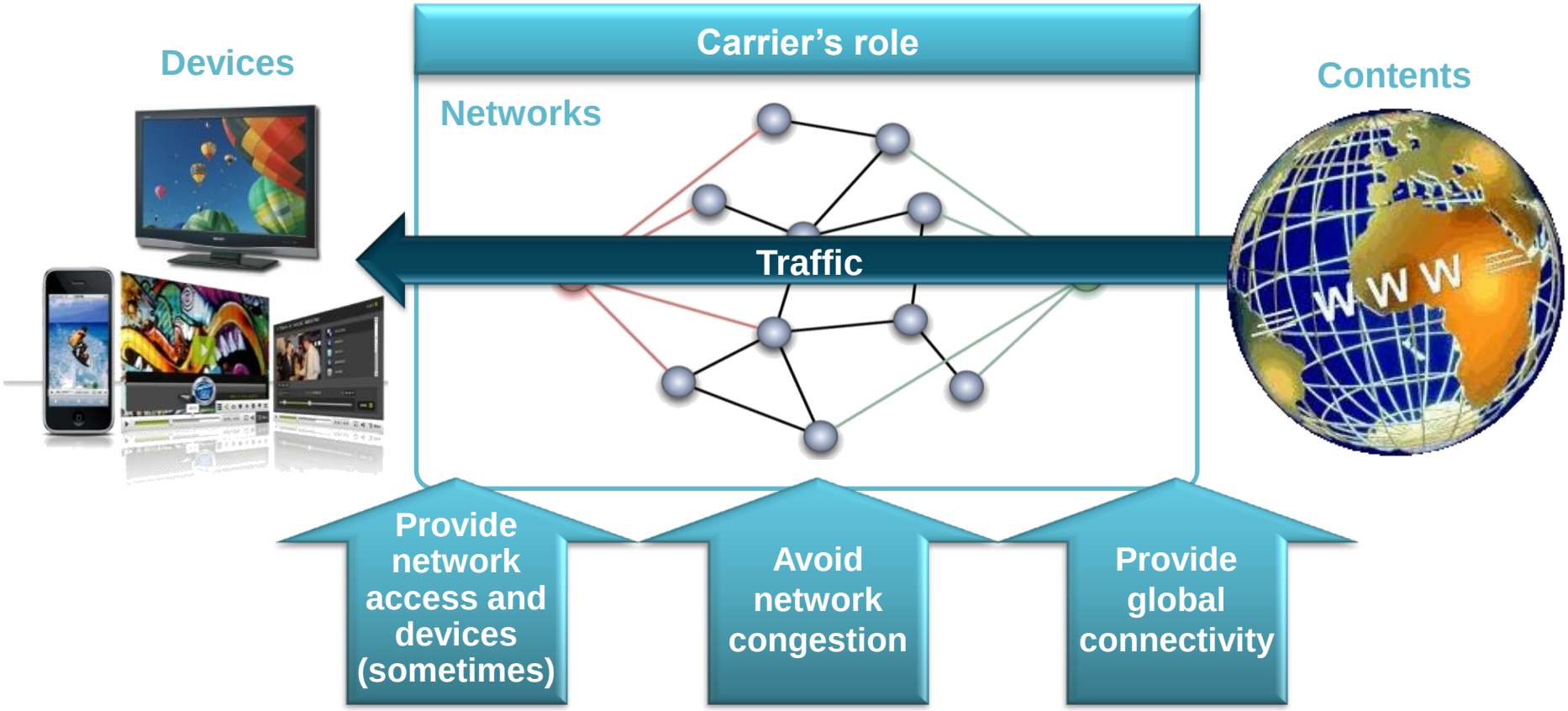
- Better for convergent networks.
- The most adopted architecture from mobile vendors.



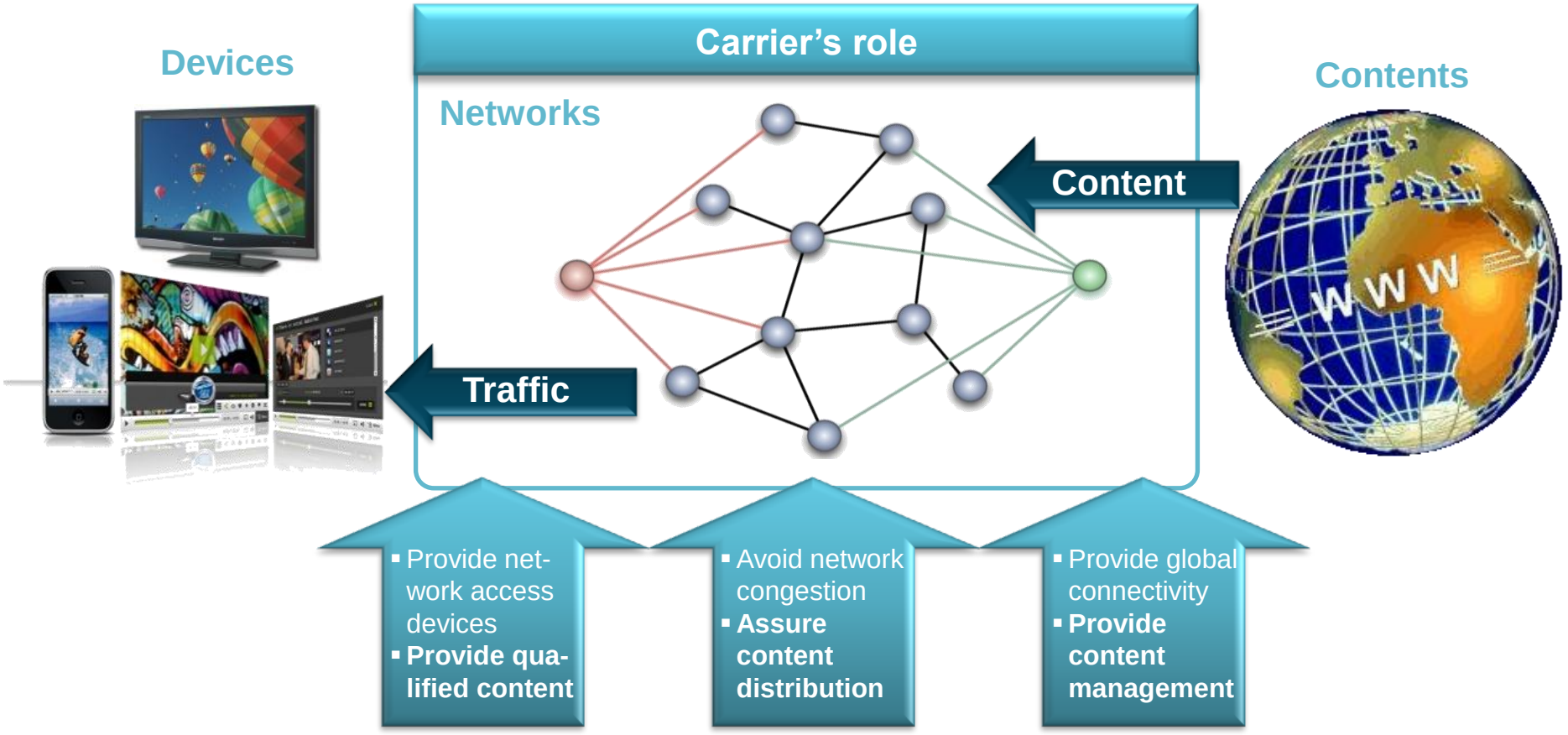
03

New opportunities for TEF

Telefónica is changing from their current role in the internet ecosystem…



… to a new carrier's role that enables efficiency and growth



Telefónica's CDN – general case
Black box approach

Customer

Content Provider

Ingests a content once

Assigns a URL

TEF CDN

Delivers the content from the closest server

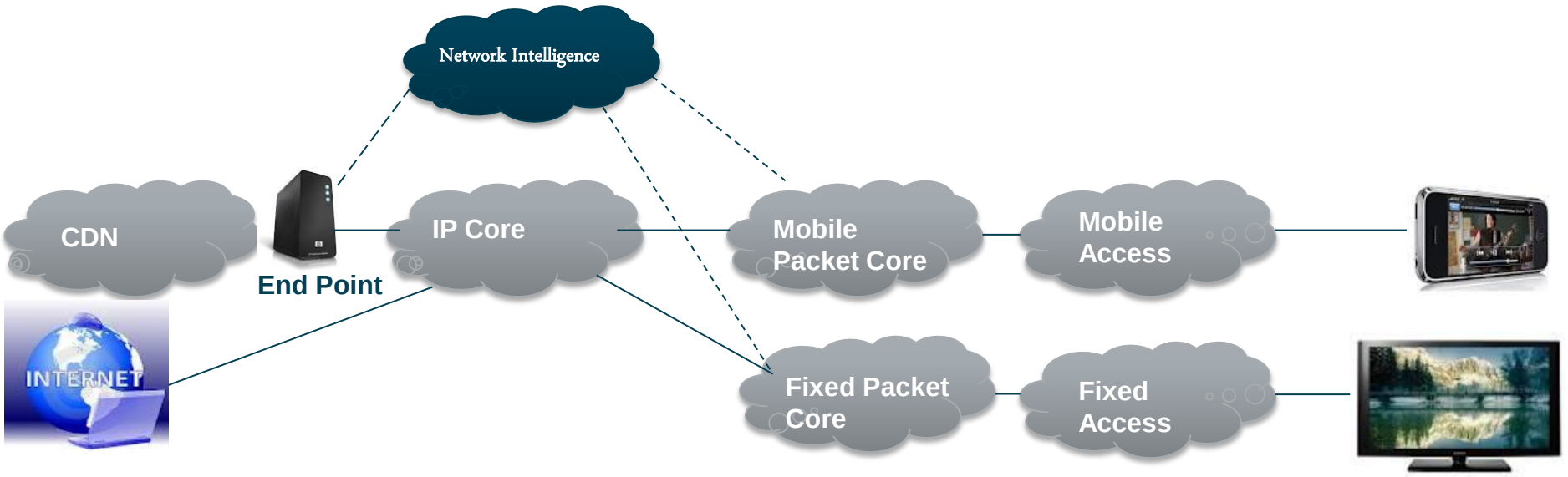
Includes URL in web page

Clicks on the URL

User

Telefónica's CDN – video use case

NI approach



Internet Traffic

- Policy applied on per user traffic based on commercial packages and products
- Different level of QoS
- Bandwidth management.
- Usage or not of online services
- Control of optimization

CDN traffic

- Policy handling via Network Intelligence
- Offer QoS when serving Premium video services over Telefonica Network prioritized vs internet traffic
- Help CDN infrastructure through APIs which enable the CDN to offer Value Added Services for external applications

CDN video advantages

- In Content Delivery:

  Different types of content with different time requirements

- Network Intelligence: adjust the network (through policies) to improve the content delivery (Prioritizing traffic, applying "changes of bandwidth")

The control plane transform the network in a:

Content aware - auto-adaptative network

Other TEF scenarios

…and its NI advantages

- **Residential Video-Conference**

  Real Time BW Control

- **CDN Intelligent Network Routing**

  Choose the best node in each situations

- **Provide online BGP routing info between AS**

  Routing info based on hop number.

- **Introduce QoE in CDN networks.**

  Inform to CDN with the QoE info of the user.

04

Reasons to apply NI Concepts and conclusions

Reasons for apply NI concepts

To add capacities in order to became real the auto-adaptative networks

- A reduction in provision or configuration times
- To improve the possibility of multivendor environments (more savings)
- To implement services that require session accounting
- To implement services that require QoS/QoE applications in the moment of connection or in real time:
  - IP assignment (depending on the contracted service)
  - Redirections to captive portals
  - Priority applications to some kind of traffics
  - Applications or changes of bandwidth depending on the contracted service or the kind of traffic...
  - VPN connections
  - ... and much more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Appendix 1. Broadband Forum Current Tasks

Broadband Forum's IPTV Work Takes Center Stage			
Focus Area	**Completed Work**	**Work in Progress**	**New work being initiated**
Digital Home	TR-135 Data Model for a TR-069 enabled Set Top Box TR-140 Data Model for a TR-069 Enabled Storage Device TR-069 CPE WAN Management Protocol TR-098 IGD Data Model TR-106: common data model template TR-142 Framework for TR-069 Enabled PON Devices	IPTV Installation Best Practices White Paper IPTV configuration Best Practices White Paper	Quad-play service Management
Next Generation Access	TR-101 Migration to IP Ethernet Access Aggregation TR-126 Triple Play Q0E Requirements	WT-114 VDSL2 Performance Test Plan WT-115 VDSL2 Functionality Test Plan WT-105 ADSL2plus Functionality Test Plan WT-145 TR-101bis WT-156 Extending TR-101 to GPON	DSL Line Profiles DSM/DLM for Video Services Transport & Home Network Quality of Service and Experience Testing for IPTV delivery
Network Operations & Policy Control	TR-113 MCM Specific Managed Objects in VDSL Network Element TR-063 VDSL Network Element Management	WT-134 Policy Management Framework WT-146 IP Sessions WT-147 Layer 2 Control Mechanism PD- 160 IPTV Performance Monitoring & Diagnostics WT-159 Management Framework for xDSL Bonding	