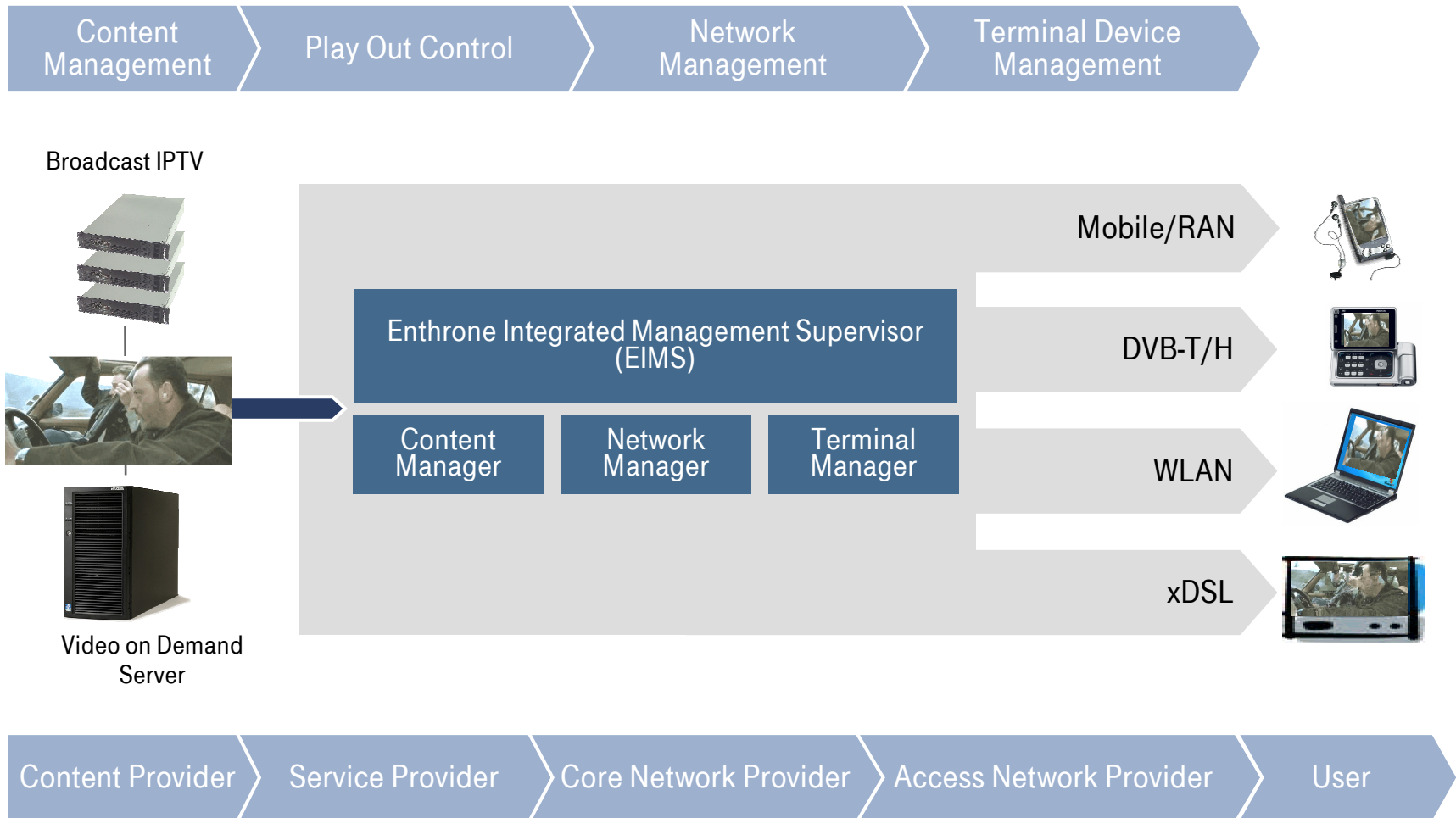# ENTHRONE Large-Scale Pilot.

WIAMIS 2008 – ENTRHONE Workshop, 07.05.2008.

Bernhard Feiten

Deutsche Telekom
Laboratories

Distributed Interconnected Pilot Deployment.
All pilot islands are interconnected by the GEANT network.

| Pilot Island	Usage Scenarios	Demonstrated Enthrone Features
Mobile TV Multi Radio	■ Video log channel sends user generated videos in a broadcast channel and on-demand. ■ Interactive enriched radio service.	■ Content Aggregation Metadata Mngmnt. ■ DVB-H, WLAN, UMTS. ■ Cross layer adaptation for Hot spots. ■ Broadcast Service Protection.
Mobile TV	■ Mobile TV and Video on Demand for people on the move. ■ Cross-border content, local news.	■ E2E QoS Adaptation with Scalable Video Content. ■ DVB-H, Mesh WiFi. ■ Perceived QoS monitoring.
Educational Content Delivery	■ High quality download and streaming to Classroom, Home and Mobile. ■ Adapted to the users device.	■ Full EIMS service management system. ■ HD Video for class room. ■ Overlay Multicast and Cashing Content Delivery Network.
E-Learning	■ Service and network management for video streaming. ■ Performance tests related to network and perceived QoS.	■ pSLS/cSLS Processing and EQoS Signaling for core and access network. ■ Perceived QoS Monitoring and Control based on audio and video probes.
Network test bed	■ Network service management. ■ Resource management for access networks.	■ pSLS/cSLS resource manager for WIMAX and 802.11e networks. ■ NQos to pQoS mapping ■ Cross layer adaptation

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Sample Usage scenario Mobile TV.
In the WLAN the broadcast channel and video clips on-demand are transmitted with an enhanced quality.
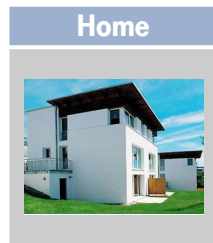
Home

When he gets on the suburban train to Paris, he can relax and continue to watch the same TV program that he already watched at home, optimized for the small screen of his Smartphone.

When he arrives at the main station, he often has to wait 10 minutes for the bus. With the new search functionality he can now find his preferred movies much better. He decides to watch the summary of the yesterdays soccer final. At the station he can receive this content using the local hot spot. He chooses to receive the stream with a guaranteed high quality using his Premium Service account.

Harry has to travel more than two hours per day by public transportation. He likes watching TV. His favorite portal offers an appealing compilation of live and on-demand music and video programs.

Access Point

Workplace
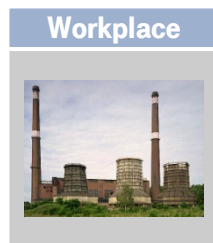
Then on the bus he finalizes watching the match summary with a lower quality. Afterwards he switches back to TV and arrives relaxed and well informed for a full working day. He still wonders how he could live without this service before.

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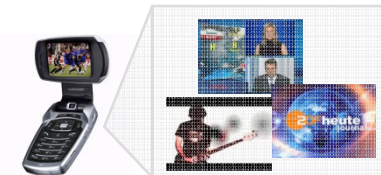
High level architecture.
Service Oriented Architecture for Content and QoS Management

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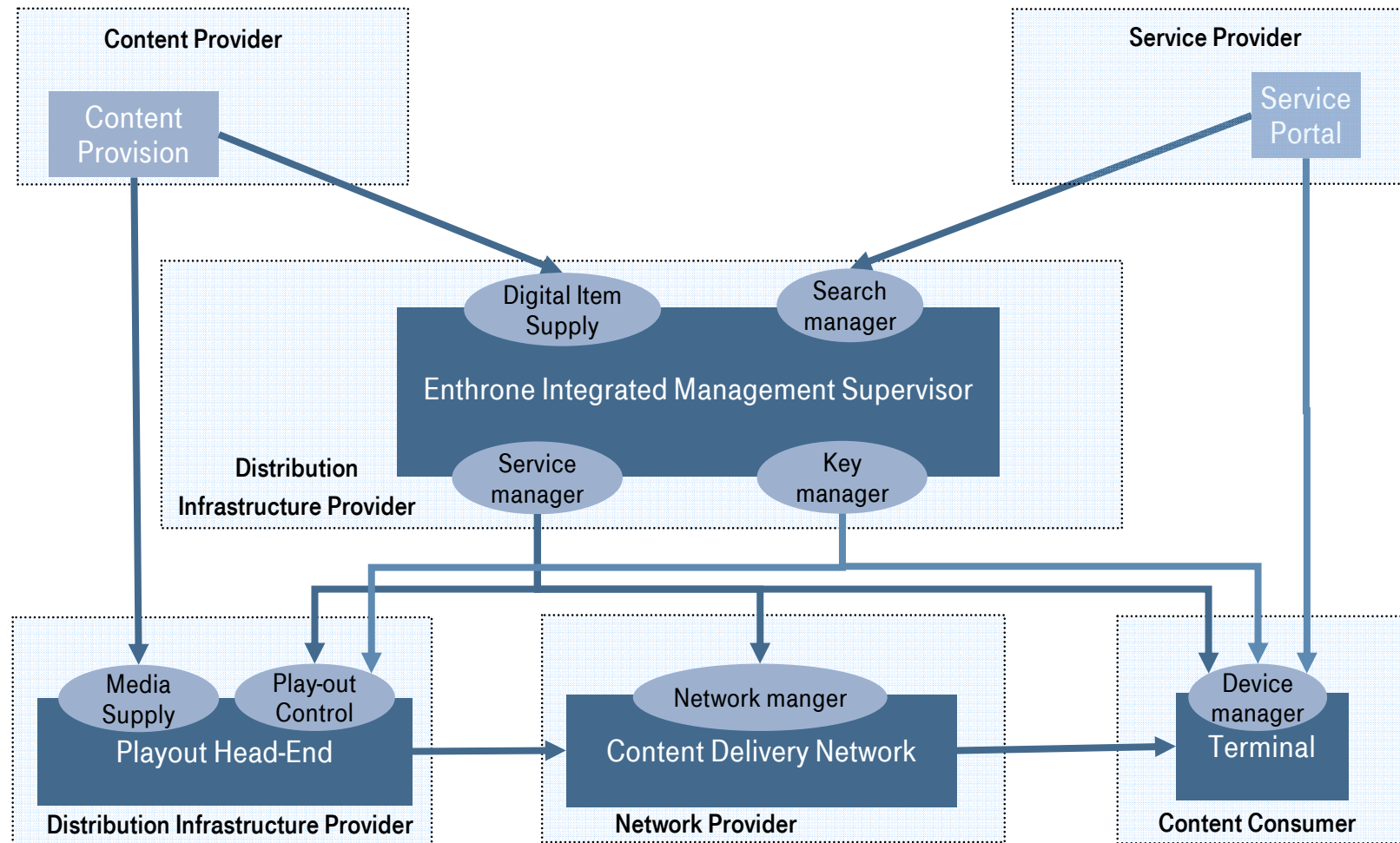
Subsystems.

Support for a large variety of encoder, transcoder, metadata, control, monitor and terminal components.

Transcoder, Transrater	EIMS	Terminal
Realtime AVC/SVC Encoder	MATool Metadata Manager	Terminal Device Manager
Offline SVC and Streamer	Search Manager	Smartphone AVC/SVC Player
Broadcast MobileTV Encod	Customer Service Manager	PC AVC Player
Broadcast IPTV Encoder	End-to-end QoS Manager	Laser Player (GPAC based)
High-Quality Ingest Encoder	Adaptation Manager	DVB-H ESG Module
SVC to AVC Adapter	Multicast Manager	DID Browser
Video On-Demand Server	Caching and CDN Manager	LC Video pQoS Probe
Advanced SVC Adapter		HC Video pQoS Probe
Error Protection Adapater		Audio pQoS Probe
gBSD-based Adapter		Content Decryptor

Content aggregation	Network	Content Protection
Digital Item Editor	Core Network Resource Manager	Remote Content Encryptor
	Network Service Manager	License Server
	Access Network Resource Manager	Service Protection Key Manager
	Network Service Monitor	
	Perceived QoS Probe	

German Pilot Island.

Hotspot QoS control by means of cross-layer adaptation using 802.11e resource management and adaptive error protection.
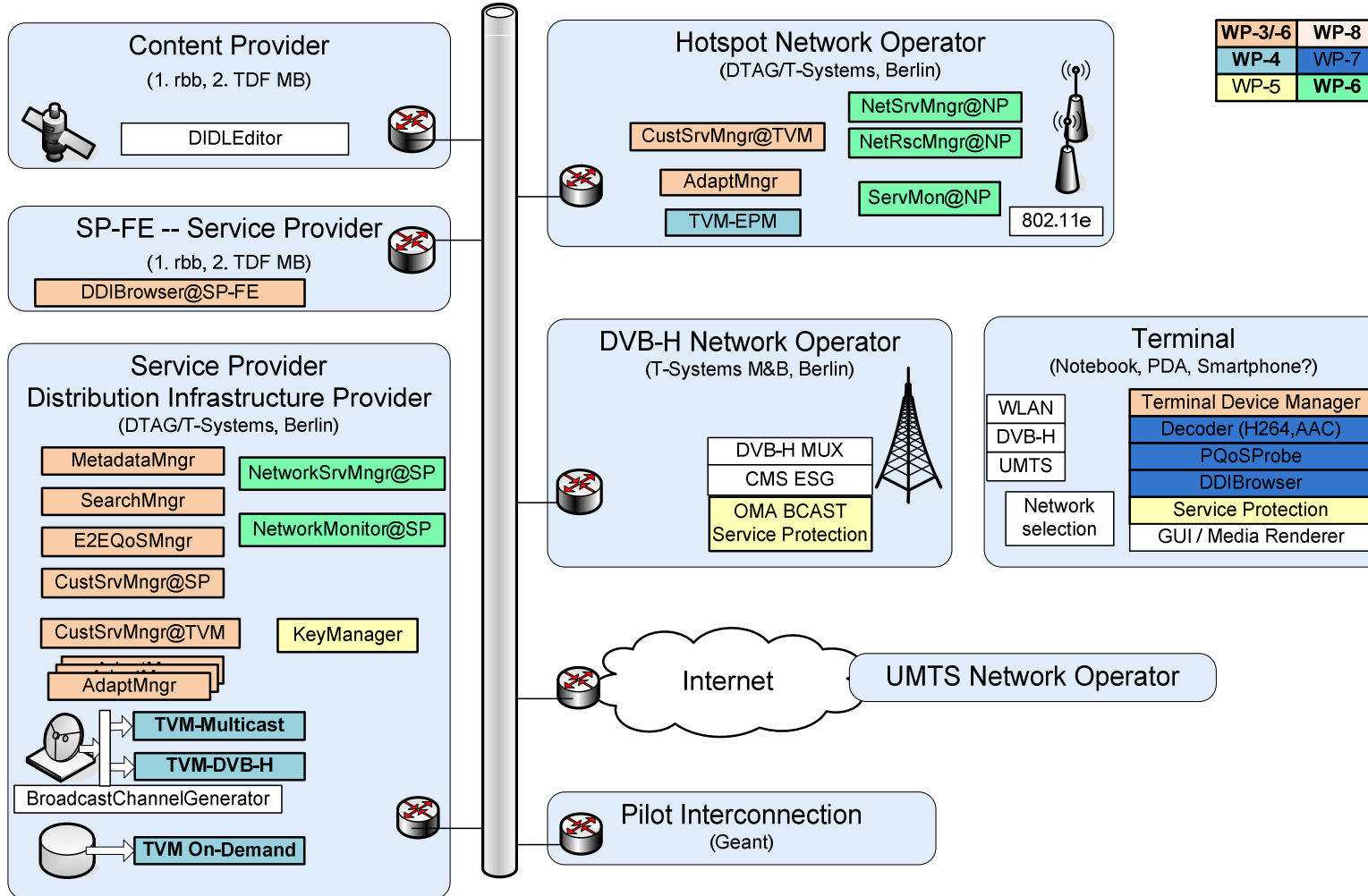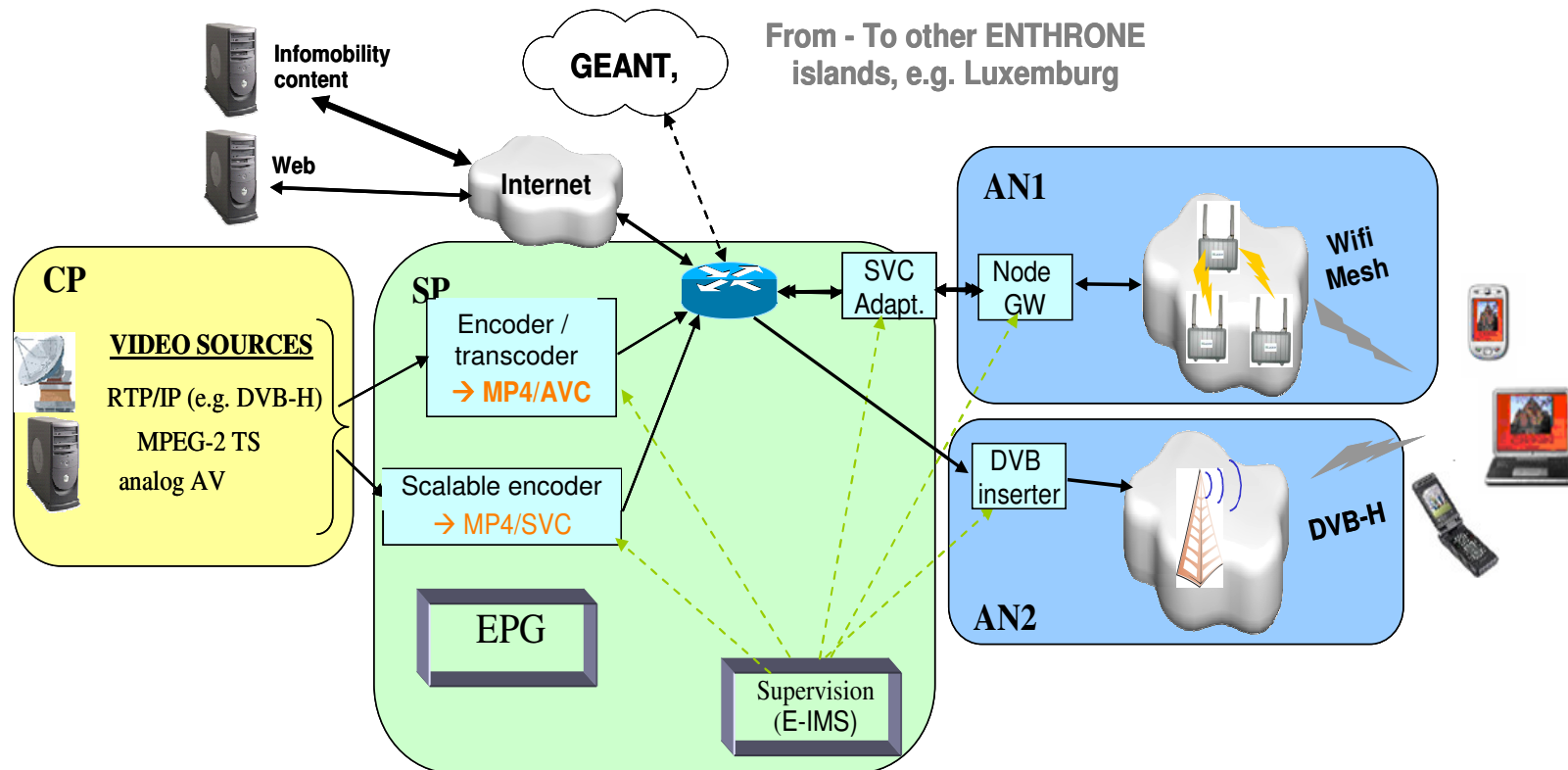
German Pilot Island.

The use cases cover the whole work flow from content provisioning to content delivery and content consumption.

| German Pilot Island Use Cases |
|---|
| 1 Content Provider provides On-Demand Content |
| 2 Content Provider provides Live Content |
| 3 Service Provider-Front End provider, Service Provider and CP create scheduled broadcast channel |
| 4 Service Provider-Front End provider manages the portal for the service |
| 5 Content Provider provides Live Content that requires encryption |
| 6 Content Consumer connects to the service |
| 7 Content Consumer browses and search content |
| 8 Content Consumer watches TV over DVB-H, HotSpot or UMTS |
| 9 Content Consumer subscribes a Service Class for WiFi streaming services |
| 10 Content Consumer watches TV over HotSpot with enhanced Quality Silver I |
| 11 Content Consumer watches TV over HotSpot with enhanced Quality Silver II |
| 12 Content Consumer watches TV over HotSpot with enhanced Quality after quality alert |
| 13 Content Consumer subscribes to an encrypted TV service |
| 14 Content Consumer requests for an encrypted TV Service |
| 15 Content Consumer watches VoD over HotSpot with adapted content |
| 16 Content Consumer continues to watch VoD over UMTS with adapted content |

France Luxembourg Pilot Island.
The streams are broadcasted in the WiFi Mesh network using scalable video coding (SVC) to support efficient adaptation.
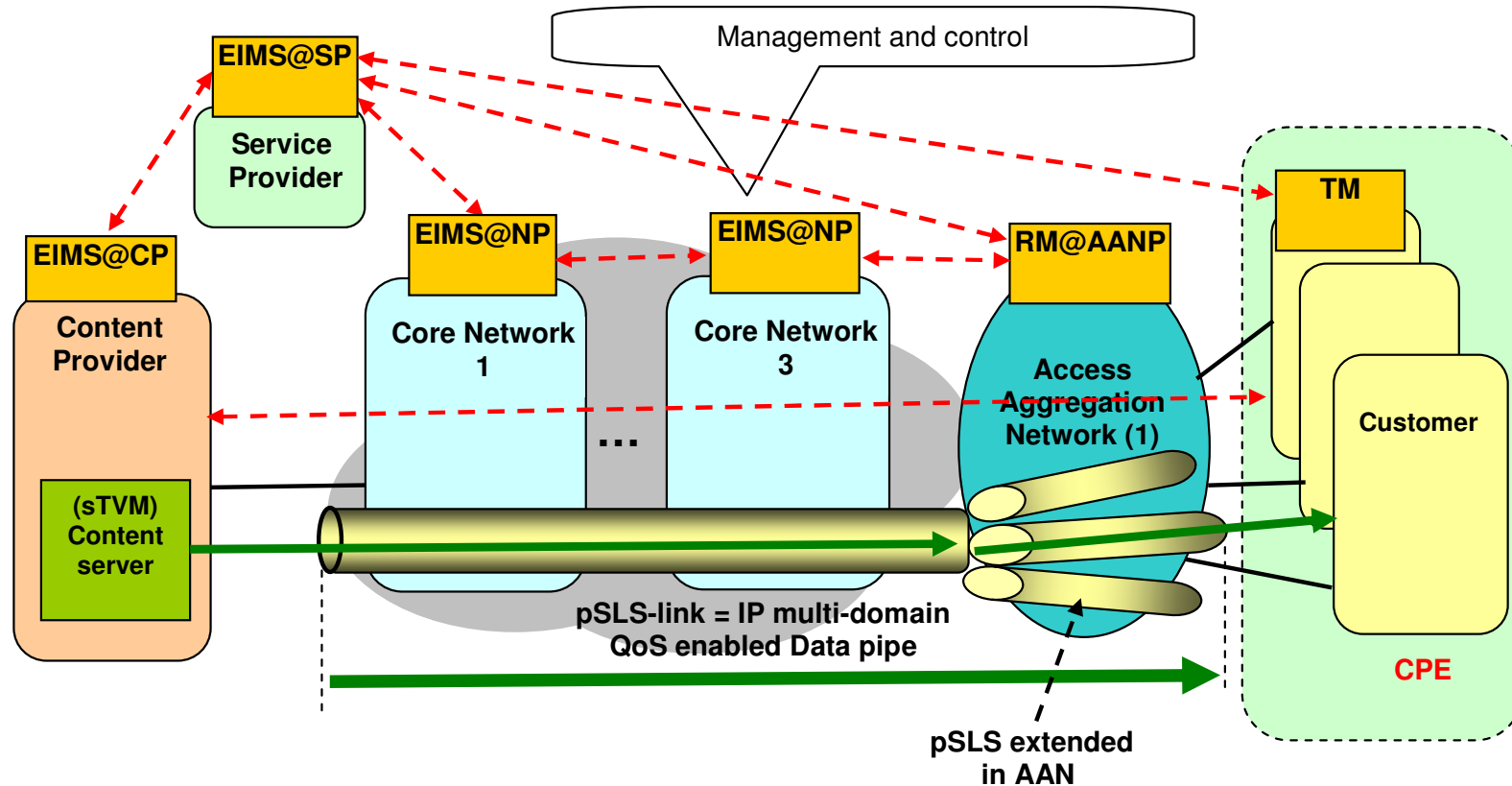
United Kingdom Pilot Island.

Deploy Content Delivery Network functionality for University of Lancaster network and the North-West England Internet.
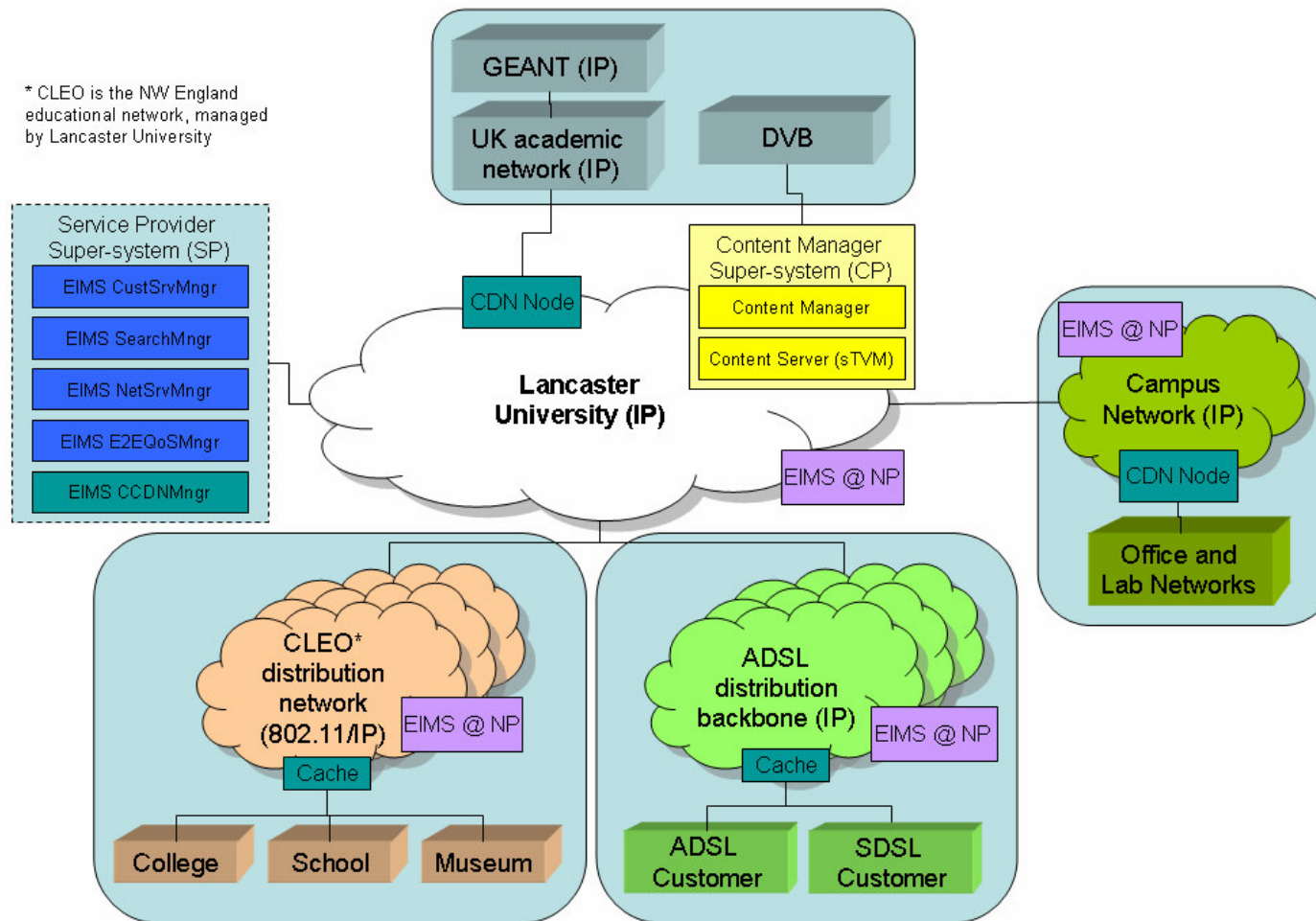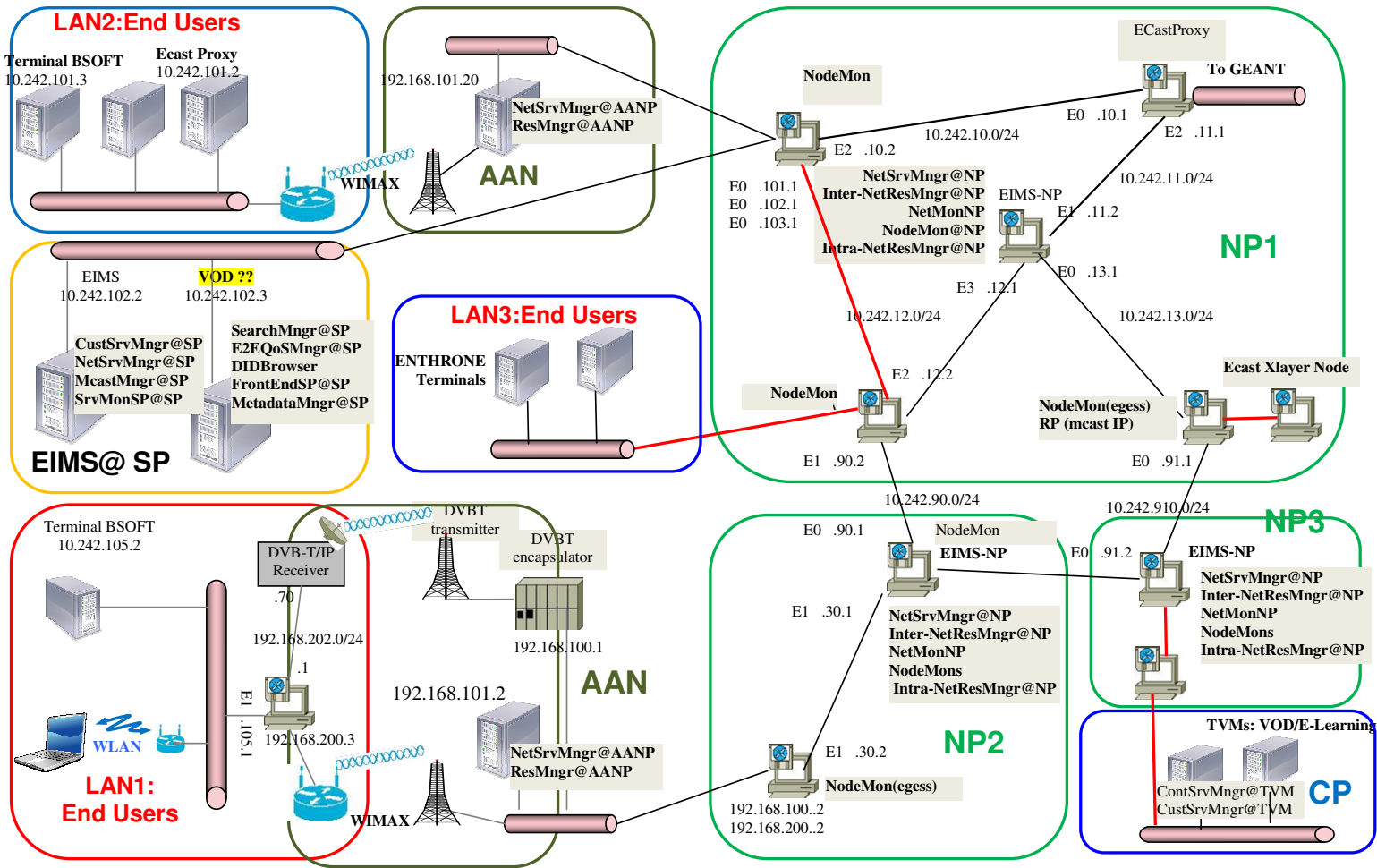
Romanian Pilot Island.
Provider and client Service Level Specifications subscription and invocation for multicast and unicast resource allocation.
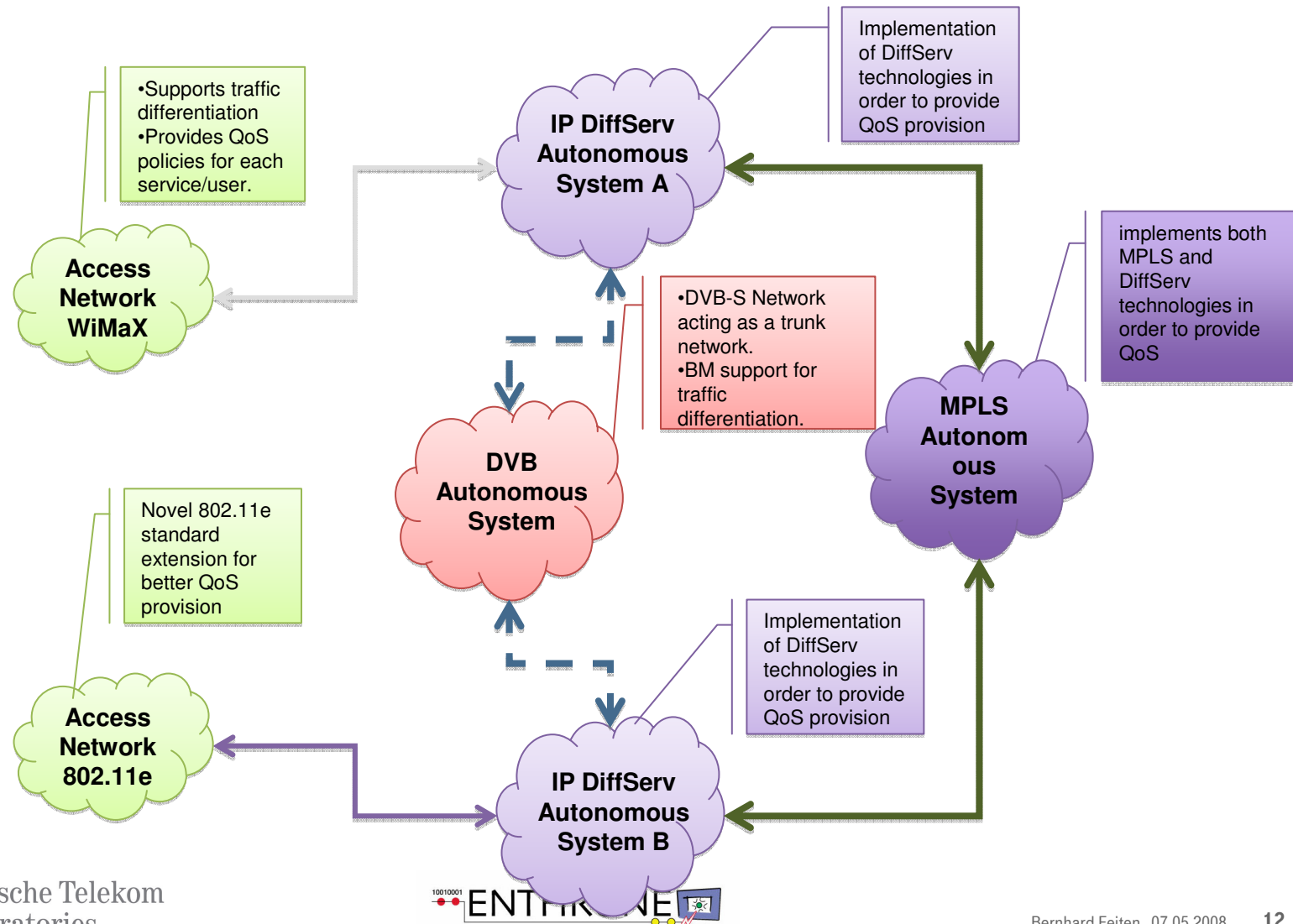
Romanian Pilot Island.

Service provisioning, content transport and delivery through various core and access networks.
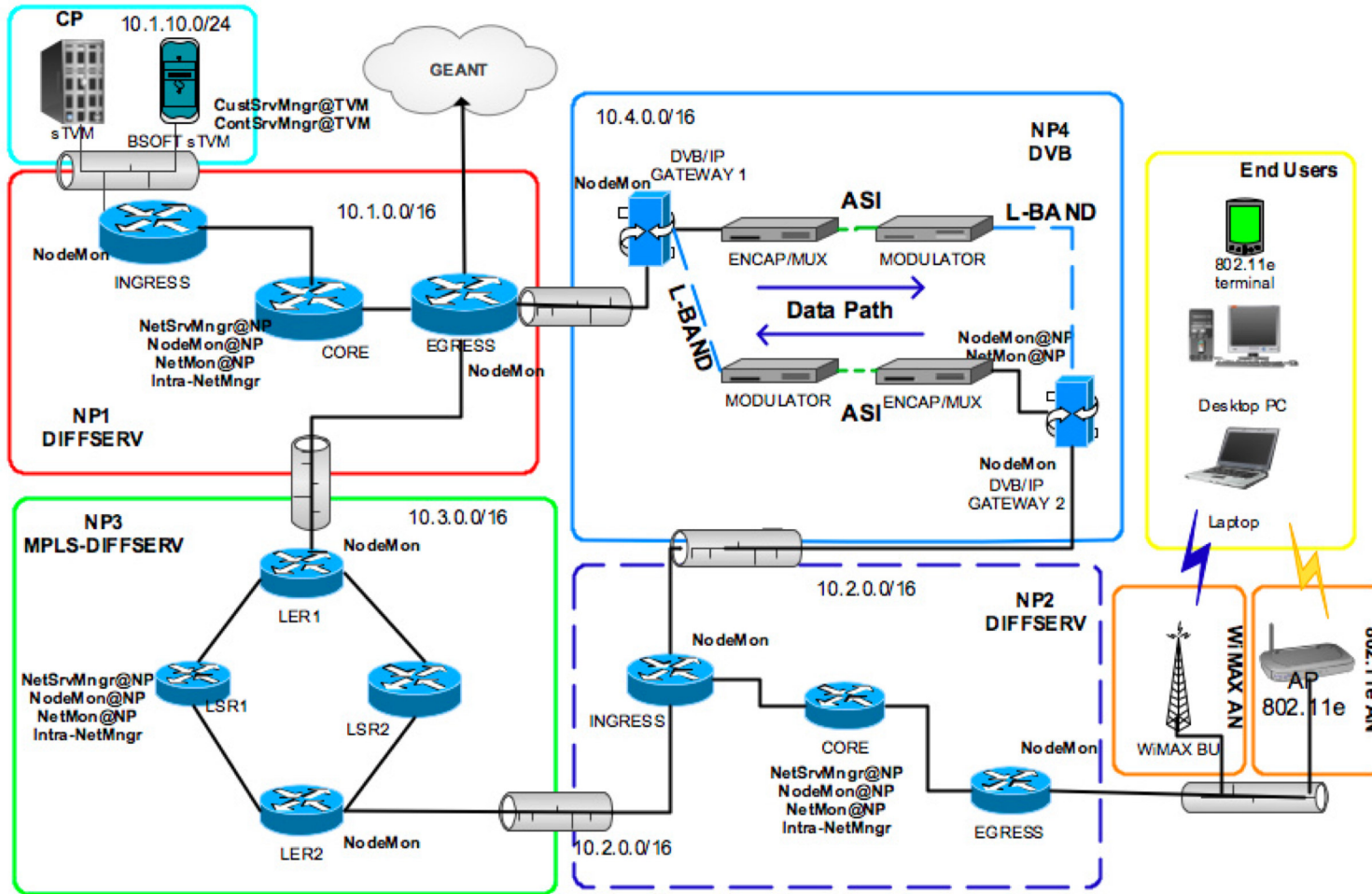
Greek Pilot Island.

Verification and performance assessment of QoS control mechanism and algorithm focused to network specific objectives.

Implementation of DiffServ technologies in order to provide QoS provision

•Supports traffic differentiation
•Provides QoS policies for each service/user.

IP DiffServ Autonomous System A

implements both MPLS and DiffServ technologies in order to provide QoS

Access Network WiMaX

•DVB-S Network acting as a trunk network.
•BM support for traffic differentiation.

MPLS Autonomous System

Novel 802.11e standard extension for better QoS provision

DVB Autonomous System

Access Network 802.11e

Implementation of DiffServ technologies in order to provide QoS provision

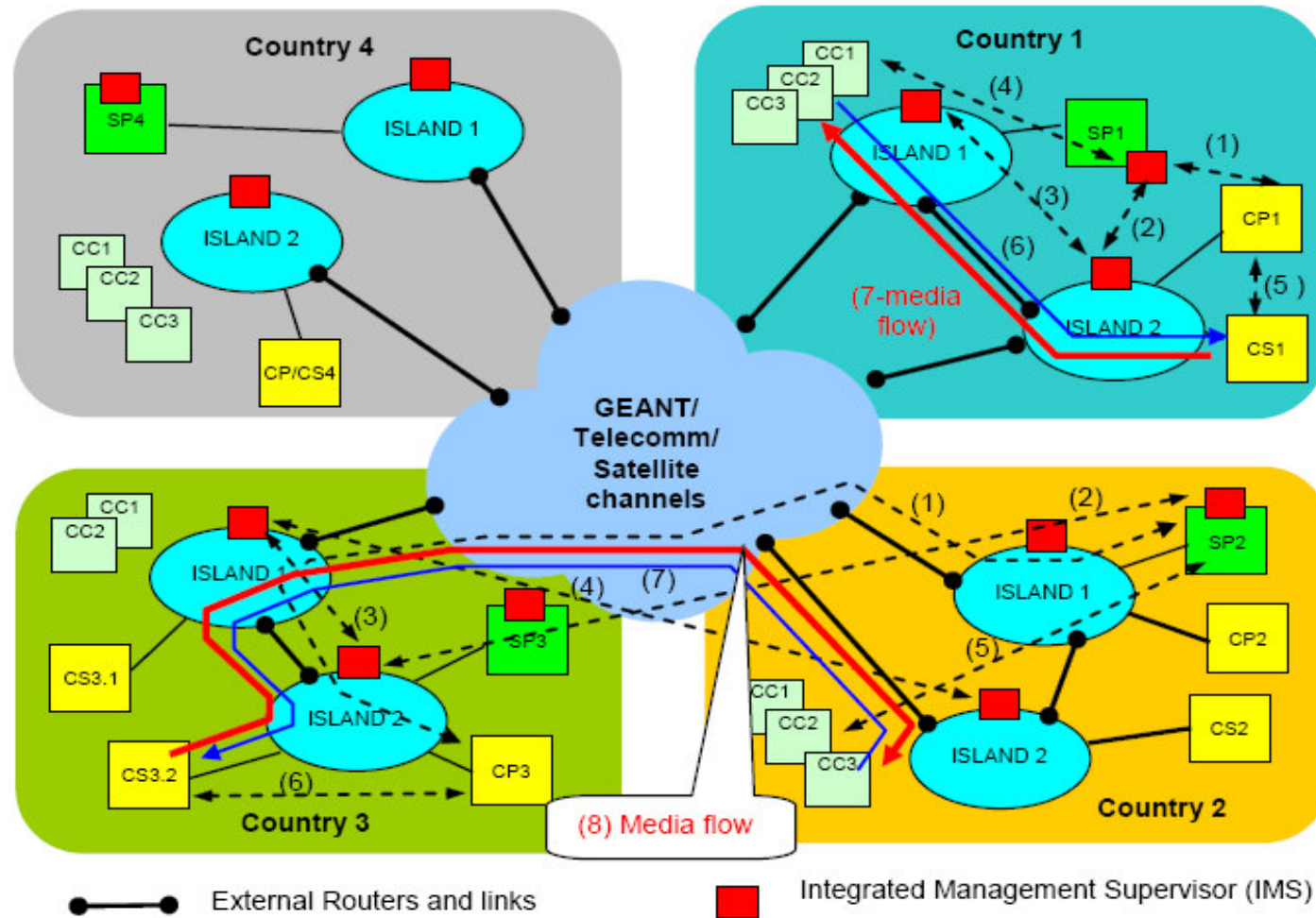**IP DiffServ Autonomous System B**

Greek Pilot Island.

Mapping of video enhance layers of scalable video coding (SVC) to diffserv and 802.11e QoS classes.

Interconnection of the Pilot Islands.
Digital item declarations and streaming content can be used by all Service Providers of every pilot island.

Large-Scale Pilot.
Demonstrating the technological basis for an open, horizontal service landscape for QoS enabled audiovisual streaming services.

Large scale pilots demostrations.
▪ Overarching metadata concepts for an end-to-end media framework for content provisioning and QoS enabled content delivery.
▪ Integrated management supervision for the control of the play-out, the network resources and interfaces for various subsystems.
▪ Cross-layer adaptation for QoS control on different layer and levels.
▪ Support for scalable video coding
▪ Inter-domain and access network resource management.
▪ Overlay multicast and caching CDNs.
▪ Integrated concept for network and perceived quality of service monitoring including QoS probes in the terminal.
▪ Distributed roles in the service landscape that allow varying bussiness models.

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