



EBU International Training Seminar- Networks2005 -  
A brave new networked world of broadcasting

## **NAVSHP (Networked Audiovisual System and Home Platforms) Concertation meeting**

### **Coordination Group 2 : End to end QoS in convergent environment and terminals**

EBU Geneva, 21-22 June 2005

# Agenda

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- **A definition for this title**
- **The start of the job**
- **Approach (s)**
- **Objectives**
- **First results :**
  - **A common understanding**
  - **First collaborations**
  - **A new method for more ambitious future results**
- **Conclusions**



# End to end QoS in convergent environment and terminals

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# End to end QoS in convergent environment and terminals

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- **What does it mean :**

- **Convergence**
- **QoS**

- ⇒ **Convergence of :**

- **content and service : Radio, TV, web, E-mail, multimedia, ...,**
- **networks : DVB, DAB, GSM, GPRS, UMTS, Wifi, Wimax, Dect, beyond 3G, ADSL, ...,**
- **terminal : linked to any of those nets, PDA, PC, ...**

- ⇒ **QoS :**

- **many kind of Services and associated Quality**
- **So it is difficult to define what QoS is exactly**

# What QoS is?

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**QoS** is at first a concept linked to the user satisfaction :

- ⇒ In QoS, the user perception of Quality is **THE REFERENCE**
- ⇒ Subjective assessment recommendation (user perception)
- ⇒ Objective measurement plus mathematics model for estimating the perceived quality (correlation with user perception)
- ⇒ Content/Service coding algorithms may have an impact on the delivered Quality
- ⇒ Network QoS : network configuration or parameters have impact on the delivered Quality of the Service
- ⇒ Terminal capabilities target the service rendering quality

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# What QoS is?

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**Different worlds (content/service ; Networks - broadcast, radiocommunication, telecommunication ; terminal), cultures, standards the situation is comparable to the Babylonian tower : it is really difficult to understand each other**



**⇒ what may stimulate the dialogue, the comprehension, facilitate collaborations?**

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# QoS : who is adressing what, who is expecting what?

## A segmentation of the QoS

Project	Content scalability	Network scalability	Metadata	Content Delivery Network	Broadcast	IP	Wireless	Radio-com	Peer to Peer	Terminals (QoS adaptive)	User aspects (usage, ergonomics)	End-to-End QoS	Network and Storage? QoS	Perceived QoS	Enhanced QoS	Error resilience	Coding algorithms	DRM
Enthroner	C	C	C		C	C	C	C	C	C	C	C			C	C		
E-Next		C		C		C	C		C		e/C	C		C	C			
Instinct	C	C	C		C	C	C		C	C	e	e	e					
Danae	C			C		C				C		C	C/e	C	C	C	e	
Ardor	C								C				C		C	C		
WCAM	C	C	C			C	C		C			C			C	C	?	
Visnet						C	C	C		C		e	e	C	C			
Soquet					C			C		C		C	C	C				
MCDN				C		C			C				e?					
Olga	C	C			C	C	C	C		C		e	e	e			C	
Future Home						C	C	C		C								
EperSpace	C	C	C			C	C	C			C	C	C/e					
SIVSS		*	C*	C		C	C					C						

C=Contributor

e=expecting

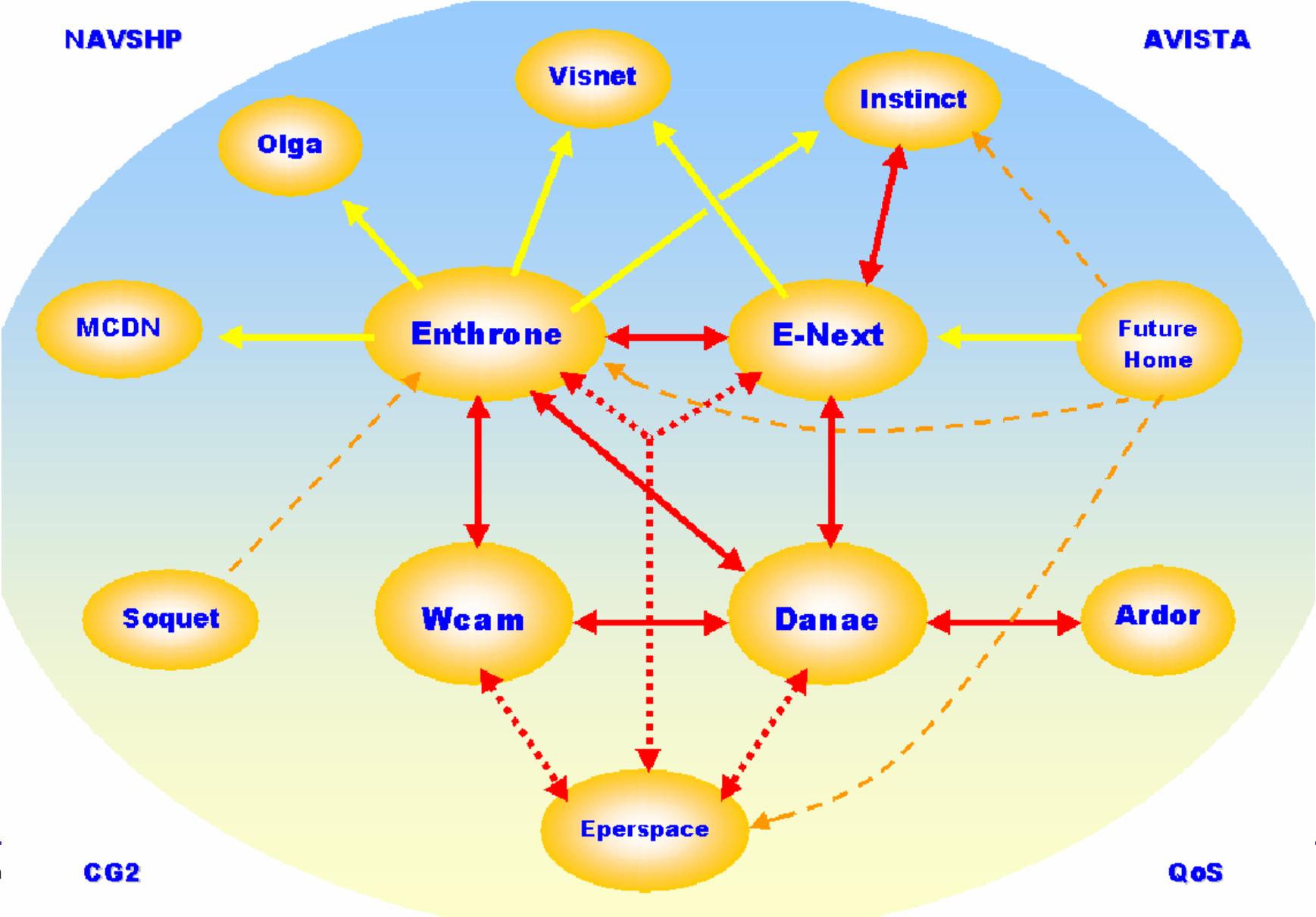
?=to be precised

\* as the head end of a net

Need for a new format, Post production metadata



# which relationships seem to be natural?



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# Coordination : which objectives, which results?

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- **Main objective** : Collaborations expected optimisation the R&D effort/investment and impact

Collaboration results at 2 levels : projects, coordination group:

- **at the projects level**

Project to project collaborations such availability of results, algorithms, prototypes, test infrastructures, etc



remark :Difficulties when starting collaborations - young projects starting intra-consortium collaborations, what to exchange, agreement, IPR, Additional work/effort, etc

- **at the Coordination Group 2 level**

to be commonly agreed



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# At the Coordination Group 2 level

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- **Several nice technical presentations in relation with difference aspects of the QoS:**

- ⇒ **Subjective tests and methodologies**

- ⇒ **P QoS (Perceived QoS)**

- ⇒ **N QoS (Network QoS)**

- ⇒ **Audio and/or video**

➔ **aiming at sharing a common common definition for QoS key terms, a common QoS culture and language.**

**Agreement on a objective at CG 2 level :**  
**common contextual approach for all projects (common references, definitions, solutions, additional benefit from test phase, mapping of QoS between PQoS, NQoS?)**

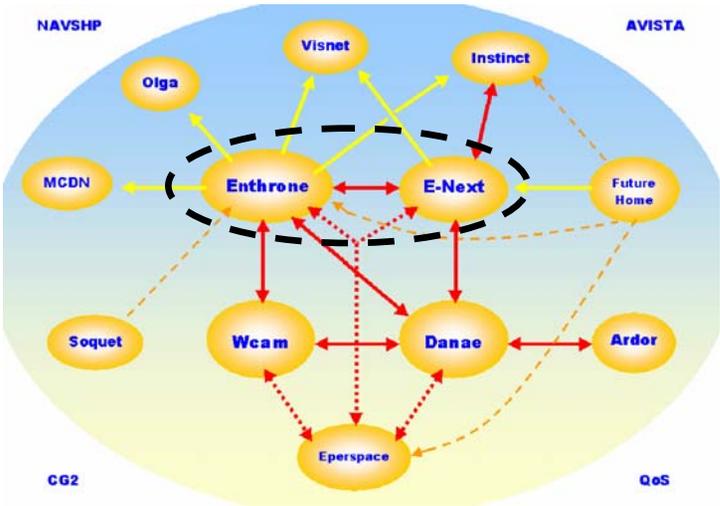
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# At the projects level : Example



Danae ↔ Ardor

**Key elements of the proposed collaboration:**

- ❖ .....
- ❖ .....

**Feed back (from consortia) :**

Who	When	What	Results (CG2, N. Projects)	Remarks

# End to end QoS in convergent environment and terminals

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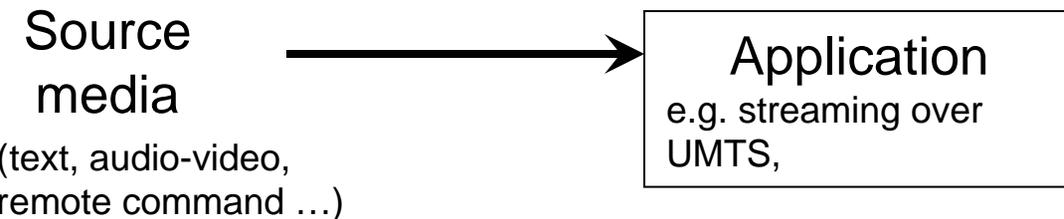
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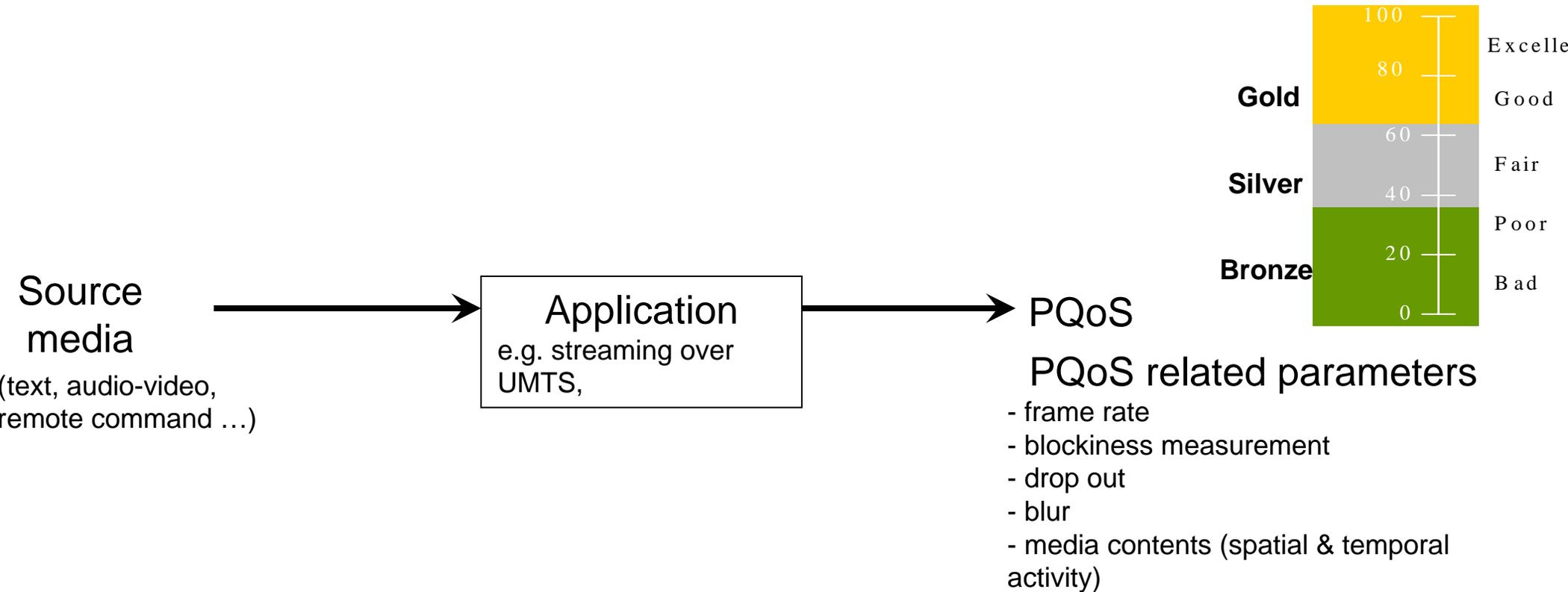
# Proposed reference QoS framework PQoS

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- **Goal: to benefit from cross-project expertise to reach an agreement on a definition of QoS and of the relevant QoS parameters**

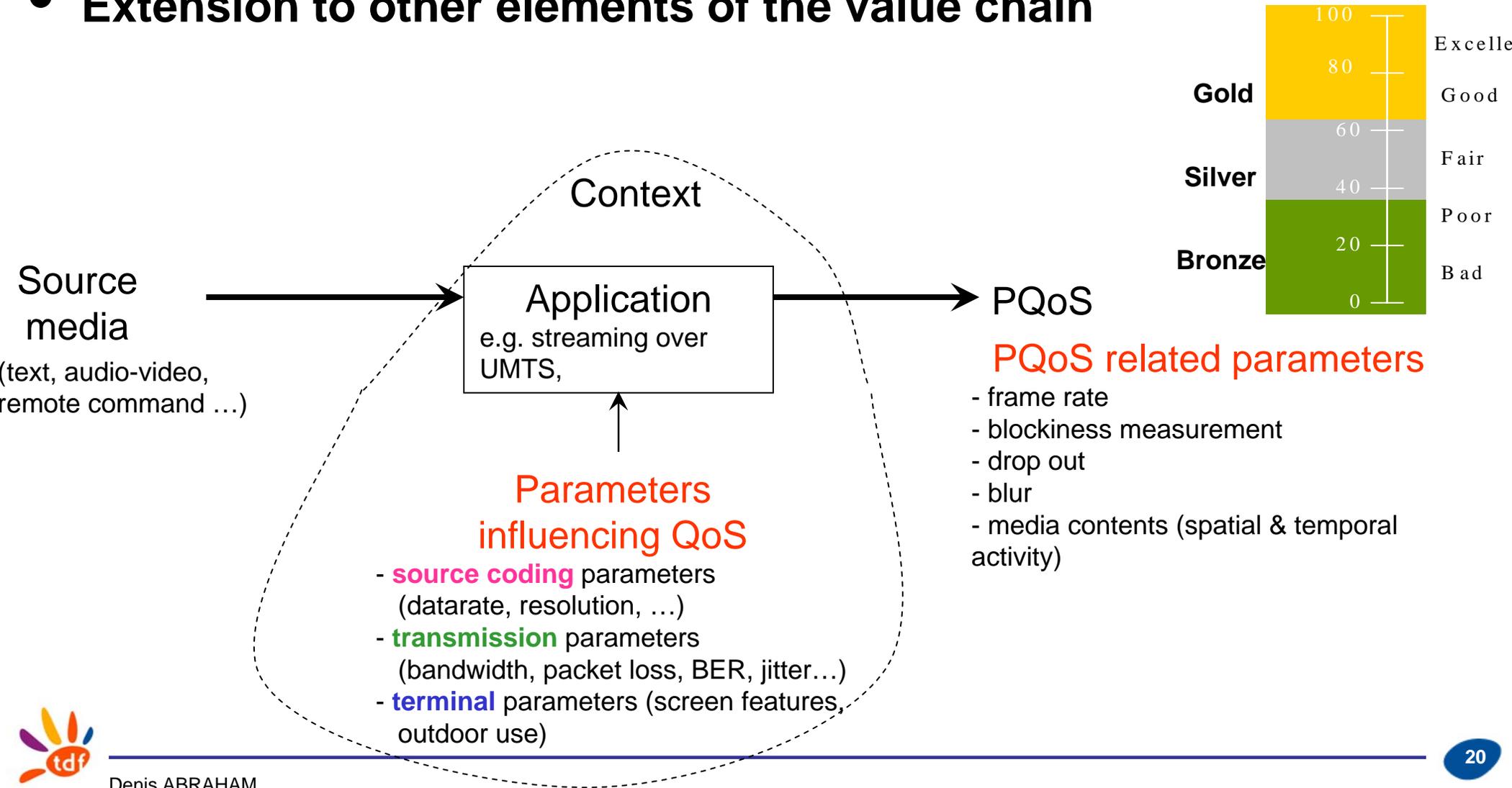


# Proposed reference QoS framework PQoS



# Proposed reference QoS framework

- Extension to other elements of the value chain



# Work under process

Proach future

Source  
Network  
terminal  
Possible  
mapping?

Cases  
to be  
addressed

Source	Format	Parameters influencing QoS	QoS measurement	QoS level	Context 1	Context 2	Context 3	QoS threshold
MPEG-1		QoS parameters data rate resolution packet loss packet size		Gold (4-5)	HD direct TV			
MPEG-2				Silver (3)	HD direct TV			
MPEG-4				Bronze (1-2)			Paying SD TV over ADSL	
H.264				Gold (4-5)			Free acces SD TV	
M JPEG 2000				Silver (3)	TV over xDSL		Streaming to mobile phones e.g. over UMTS	
				Bronze (1-2)				
				Gold (4-5)				
				Silver (3)				
				Bronze (1-2)				
				Gold (4-5)				
				Silver (3)				
				Bronze (1-2)				
				Gold (4-5)				
				Silver (3)				
				Bronze (1-2)				
				Gold (4-5)				
				Silver (3)				
				Bronze (1-2)				

Contexte of use

- addressed several times?
- Availability of tools, algorithms, reference, parameters, threshold values?
- lacks?
- Expectations, ...



# Today coordination : At the projects level

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- Ardor/Danae (a reported fruitful collaboration),  
Danae used Ardor objective estimator of the perceptual audio quality during it field trials
- Enthroned/E-next,
- Wcam/Danae,
- Enthroned/Instinct,
- ...

# Today coordination : At the CG 2 level

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- 1) Excel file (context description) to be **fine tuned**
  
- 2) There is a clear need for projects collaborations (subjective assessments reference, objectives tools, measured values (even roughly estimated), threshold positioning as input for adaptation process, etc
  - A) Agreement on a **format of files** (content - reference and impacted)
  - B) Creation of representative **files to be made available** for objective tools designers
  - C) Check whether the tools could help
  - D) Use of the objective tools : **resulting values to be made available** back
  - E) Open doors for new collaborations
  - F) **Storage** of original contents and impacted ones, allowing non simultaneous subjective tests in parallel with objective measurements, additional content for of other projects
  
- 3) Second need : expert discussion aiming at identifying interoperability (examples : MPEG 2 interface, networks allocation/available resource, trigger for adaptation process for contents)

**Big work still to be performed**



# End to end QoS in convergent environment and terminals

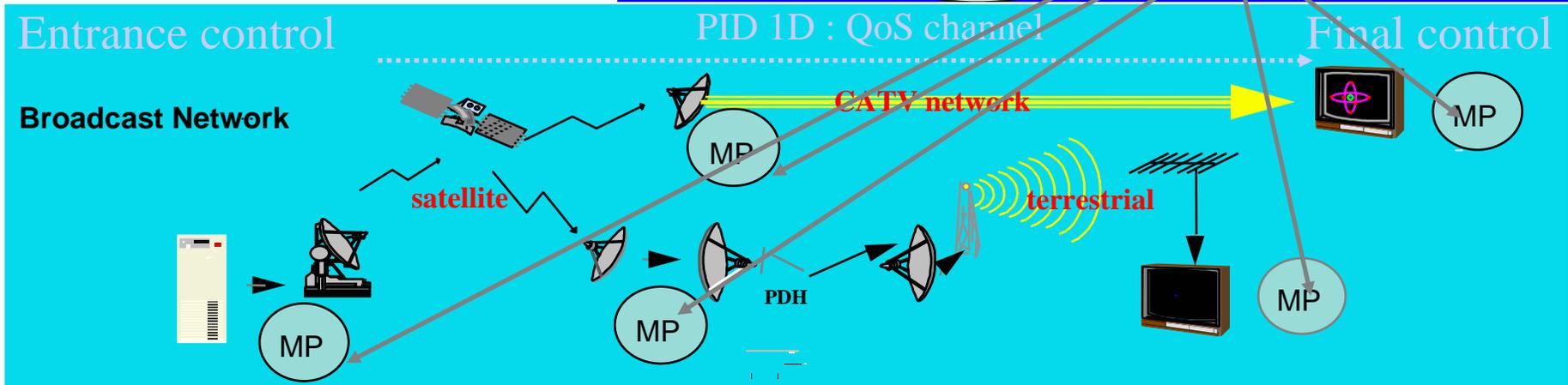
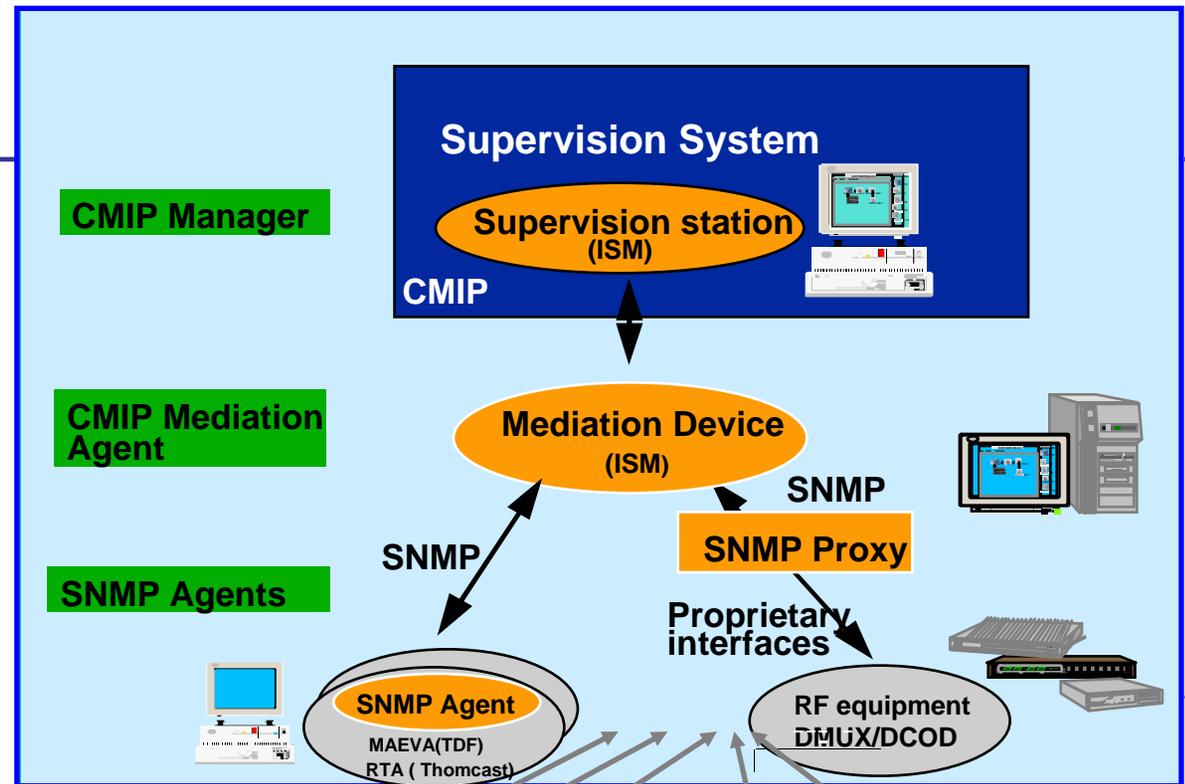
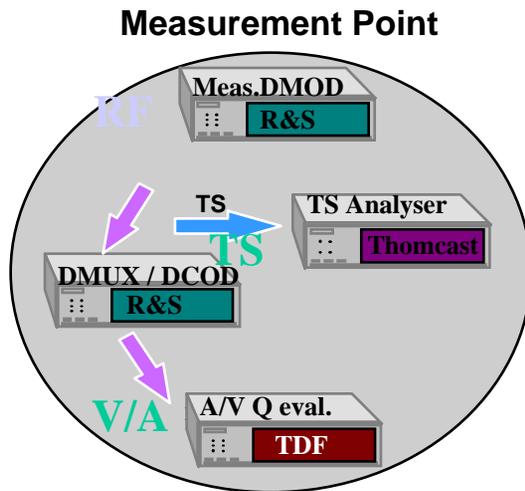
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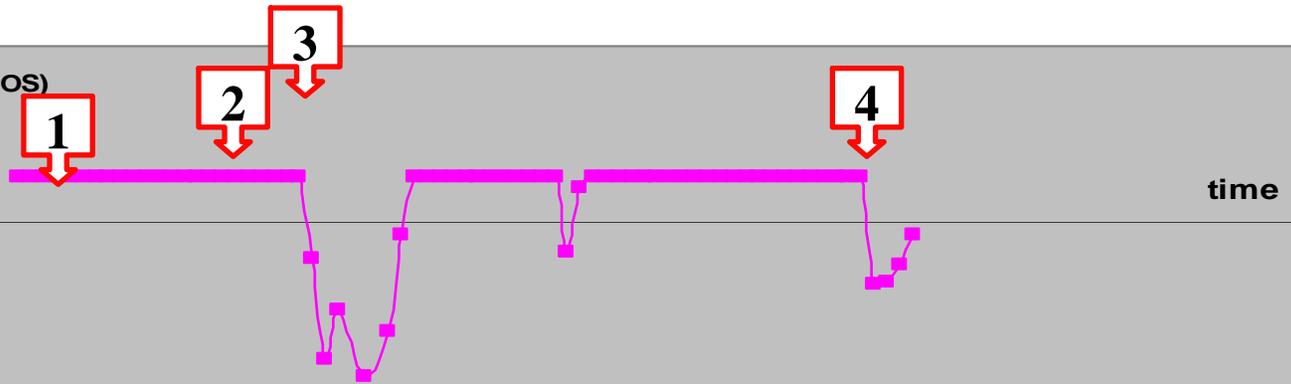
# European collaborations : realistic results - 1st example

## QoS concept

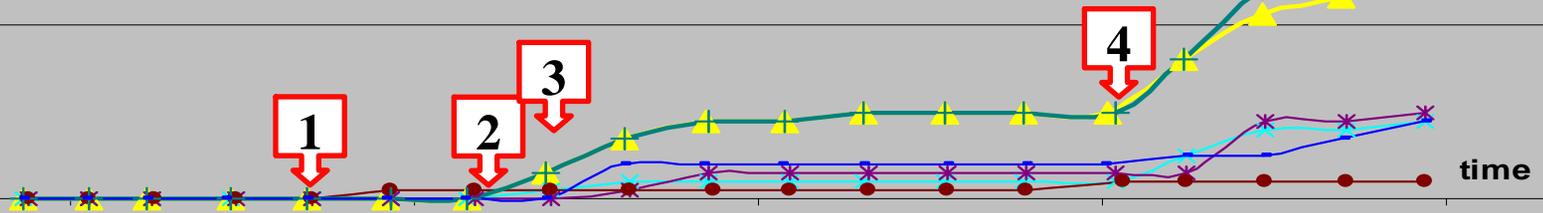


# Early results

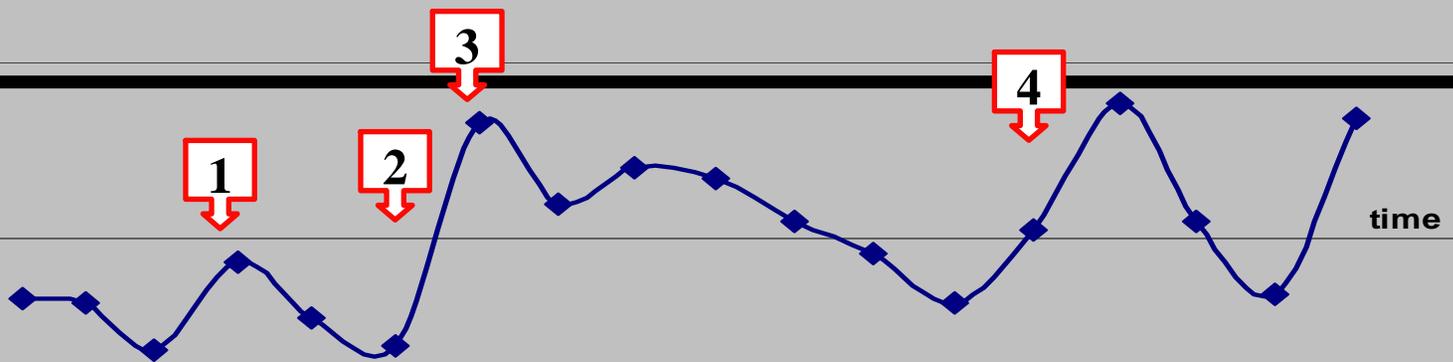
Video Quality Measurement (MOS)

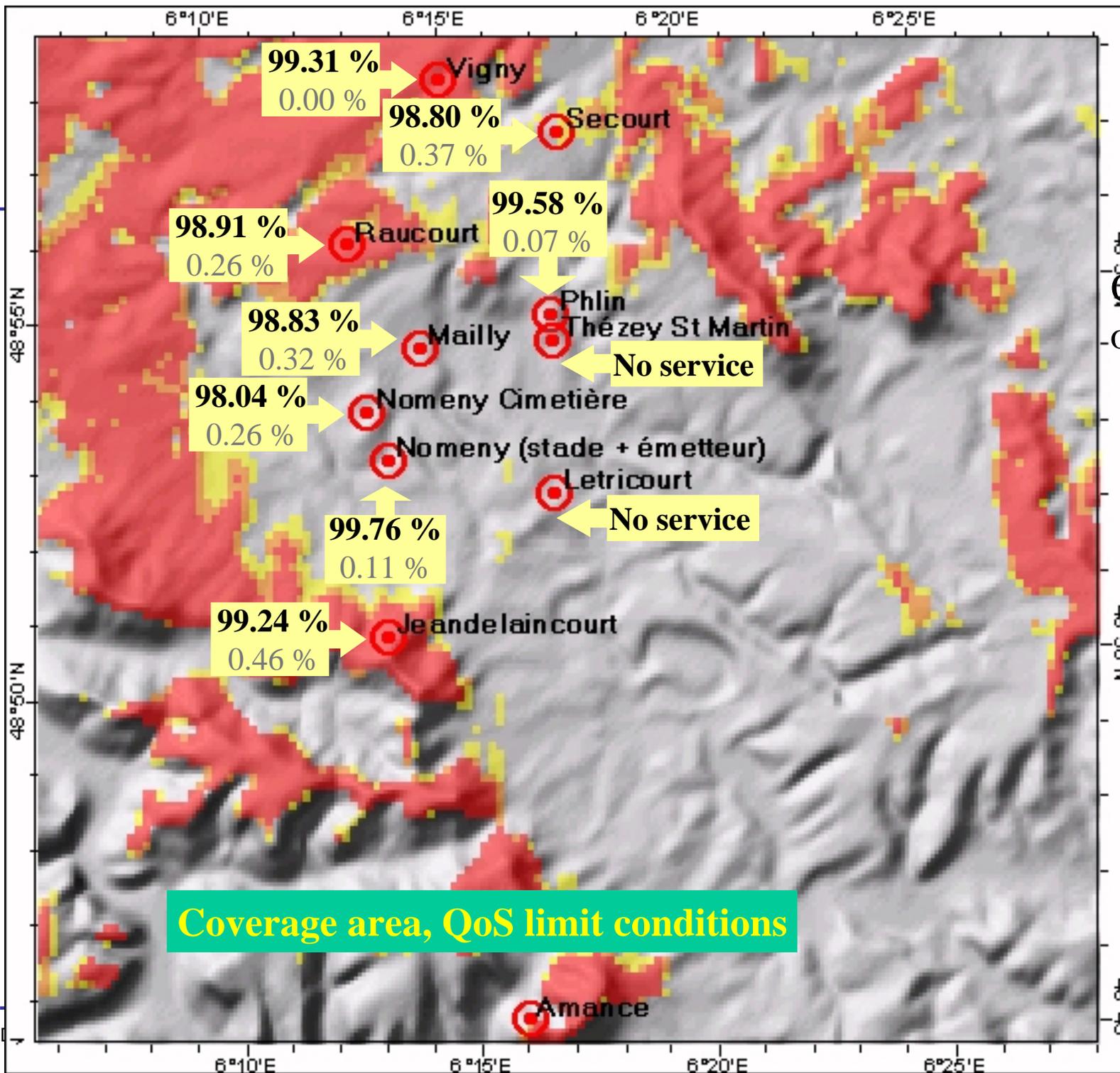


TS Analysis



BER





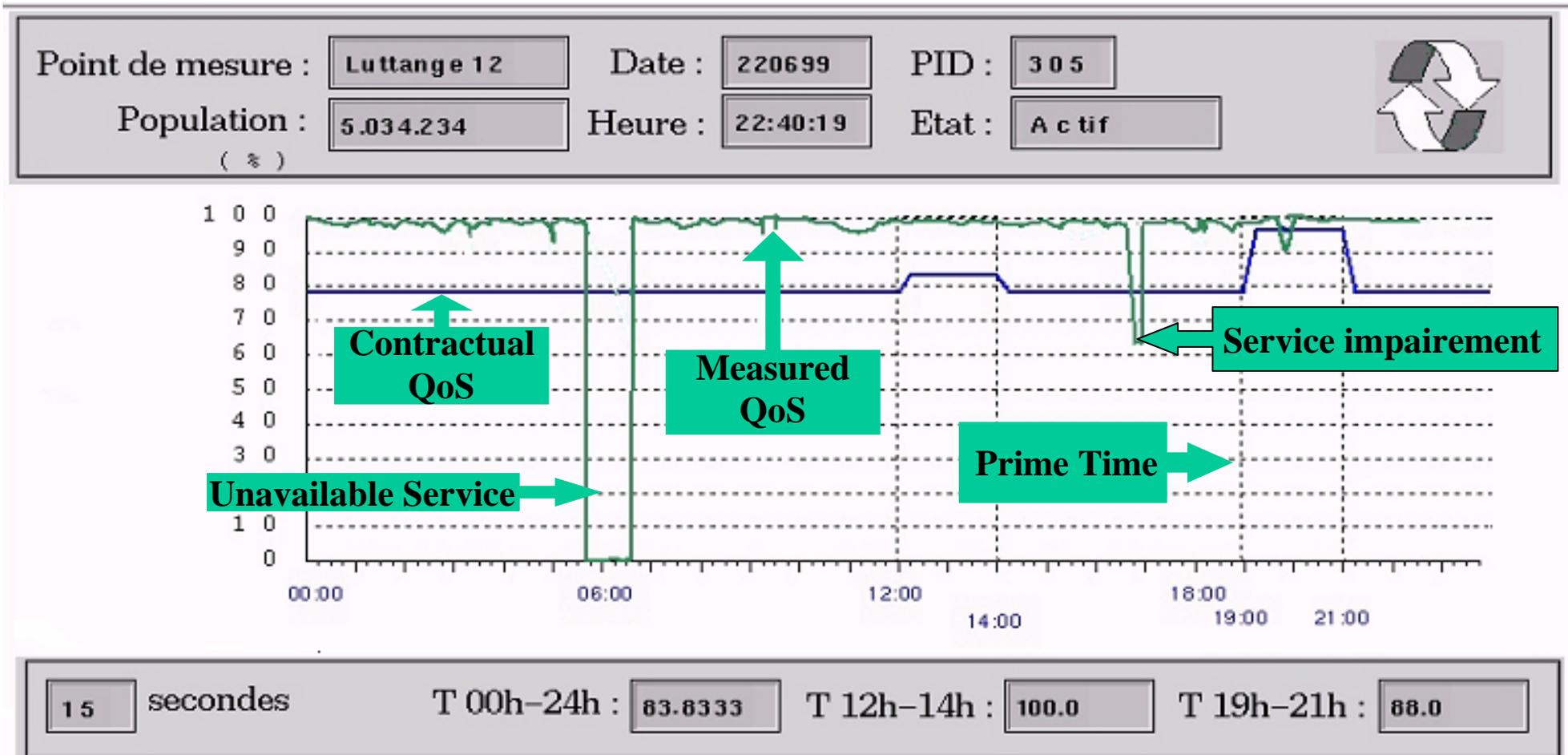
QoS : validation of the Service are

MOS 5  
MOS 1

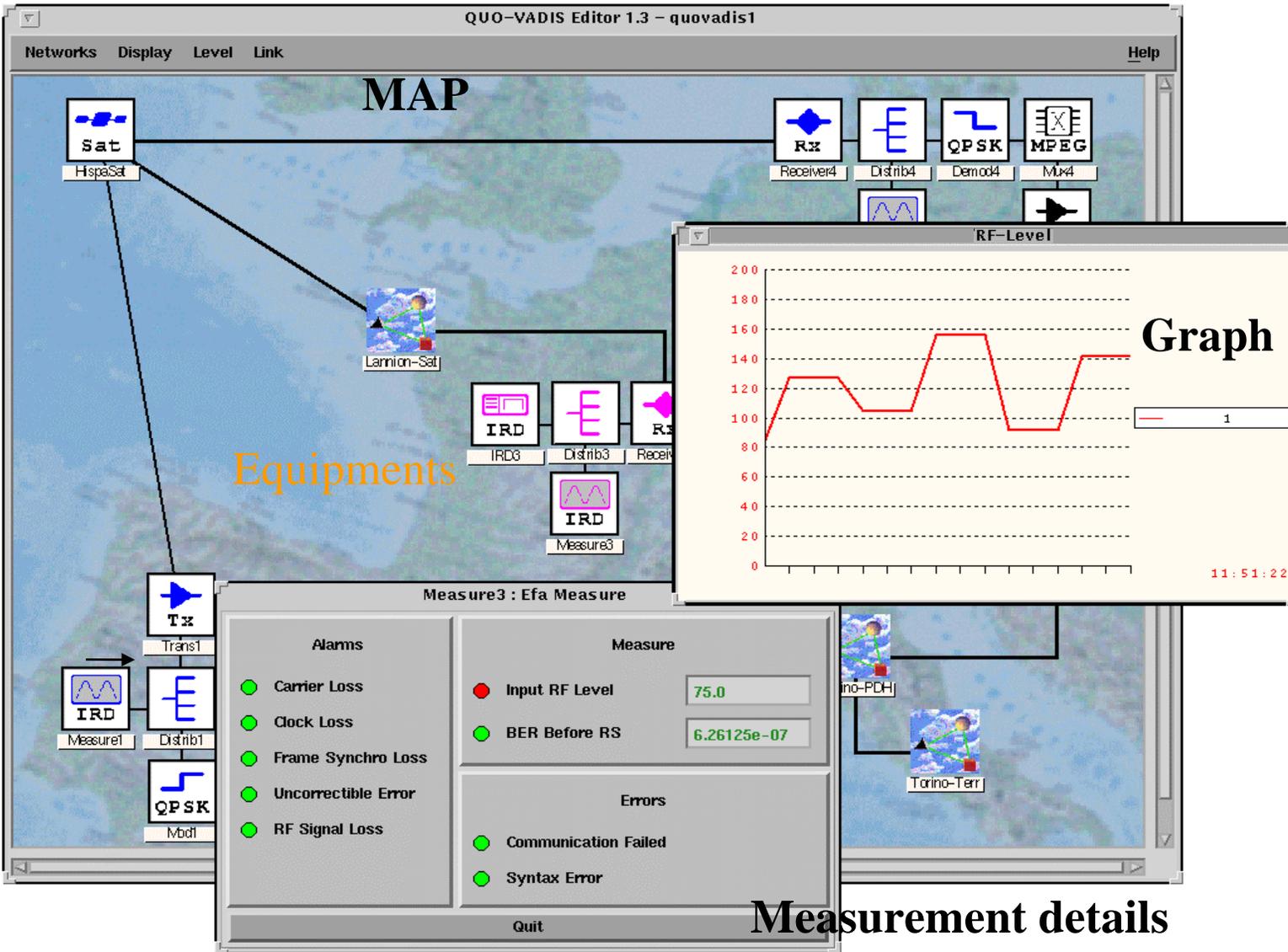
Coverage area, QoS limit conditions



# QoS : Contractual Reporting



# QoS: monitoring of the network



# Impact - ETSI/DVB MG : TR 101 290 chap 5.5

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The statistical exploitation of the data base permitted to define 3 parameters representatives of the Service performance derived from the TS analysis (ETR290) and included in the ETR290 revision 1 (9/2000) draft :

## **Service\_Availability\_Error and Service\_Availability\_Error\_Ratio**

Under certain receiving conditions, the purpose is to identify severe distortions and interruptions of the service.

This parameter represents the loss of the service

## **Service\_Degradation\_Error and Service\_Degradation\_Error\_Ratio**

Under certain receiving conditions, the purpose is to identify severe degradation.

This parameter represents the level of strong impairments in the service

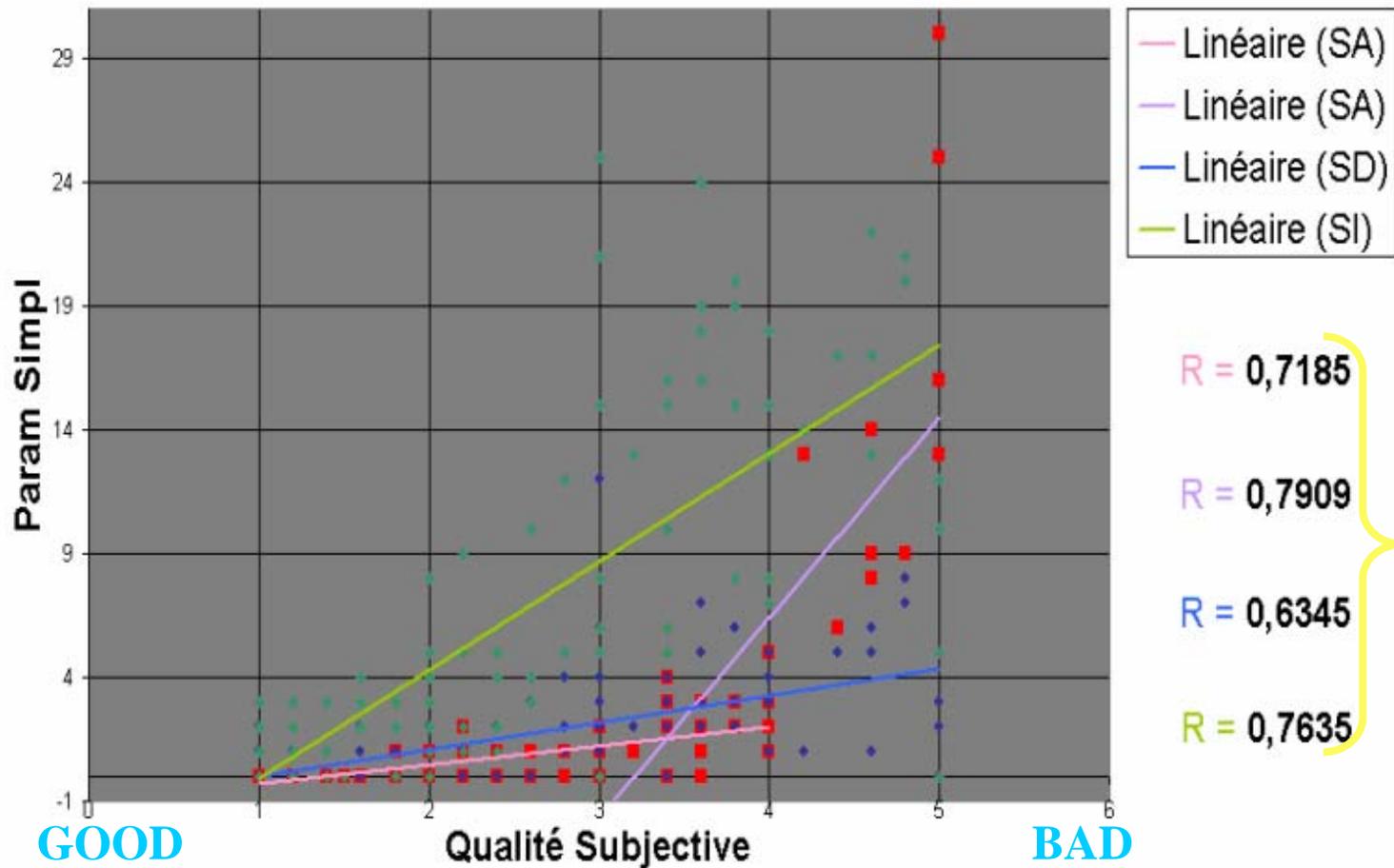
## **Service\_Impairments\_Error and Service\_Impairments\_Error\_Ratio**

Under certain receiving conditions, the purpose is to identify first signs of service degradation under certain receiving conditions.

This parameter represents unfrequent or slight impairments of the service

# Service\_Impairments\_Error

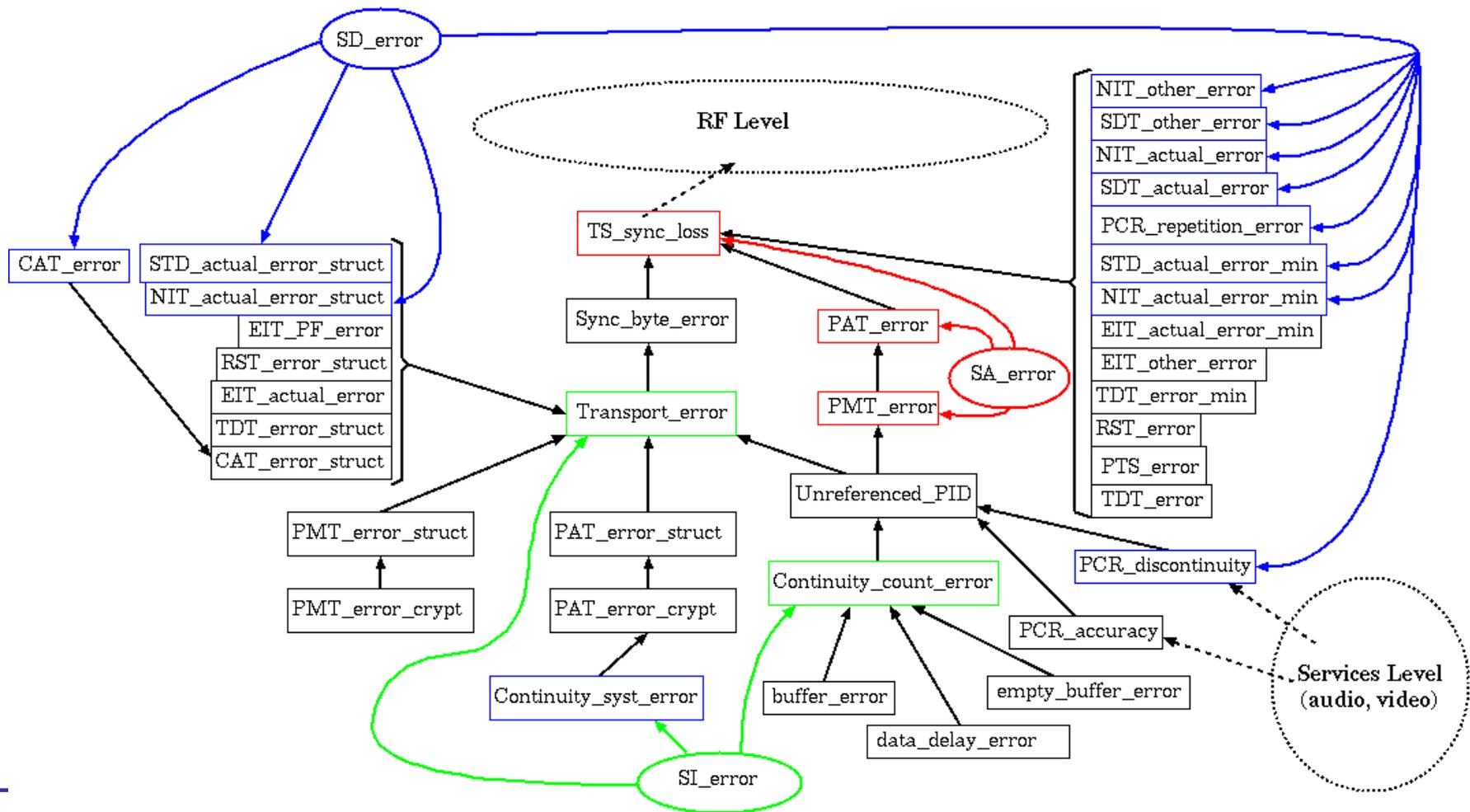
## Paramètres Simplifiés / Qualité Subjective



Subjective/objective relationship ratio for real programs

# Puplications :

- EBU Technical review, April 2005 : The challenge of QoS (synthesis)
- IBC? : correlation between alarms (Quantity of alarms)



# 2nd example representative of many cases

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Only as an example lets consider an **audiovisual** content, **MPEG** encoded, using a **MPEG Transport Stream** protocol, **IP** encapsulated

Is there any existing standards for such situation? Yes

- estimation of video or audio quality (under discussion in ITU), **linked with user perception**
- MPEG-TS measurement guidelines (ETSI TR 101 290) - “Service performance” **linked with user perception**
- existing IETF
- ....

The question is then : is there any reason to search **new** QoS parameters/algorithms?

If yes, precise the **lacks**, the **expected added value** of the new parameters/algorithms after **having use existing things** in order to check if they meet your needs before starting new studies, contributing to standards,

Keep in mind that QoS should be **linked to THE REFERENCE : user perception**



# Conclusions : CG2 spirit

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A step by step approach :

- Need for an exhaustive **gathering of existing QoS standards**, parameters, algorithms, tools, results, etc, to check whether they solve your problem,  
Good reasons to use them (or ...)
- Need for an exhaustive **identification for other teams working on similar problems**
- CG2 as an example (fruitful collaboration represent “sometime” the right way to the success, lonely studies might be expensive)
- **New** aspects may appear (for example: time seems to be high of interest in the QoS, this is rather new in the QoS world).
- **In such a case** there are places for **new** studies, **new** standards, ...

# interests

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CG2 : End to end QoS in convergent environment ; different aspects :

- **Interworking, interoperability:**

QoS is the cherry on the cake of the converging but competing world

- **Economic impact:** CG2 allows to optimise the study effort

(prevent from reinventing the wheel - studies are time and money consuming ==> collaboration means shared costs), tools meeting the needs of more players (critical mass), more users, maximum impact on standardisation bodies, facilitate a larger use, ...

- **Social impact:** difficult to say, but for sure this will benefit to European players

- **Technological impact :** ambitious results still expected that should underline technological impacts



**CG2 is open to any people that would like to participate**

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Thank you for your attention

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