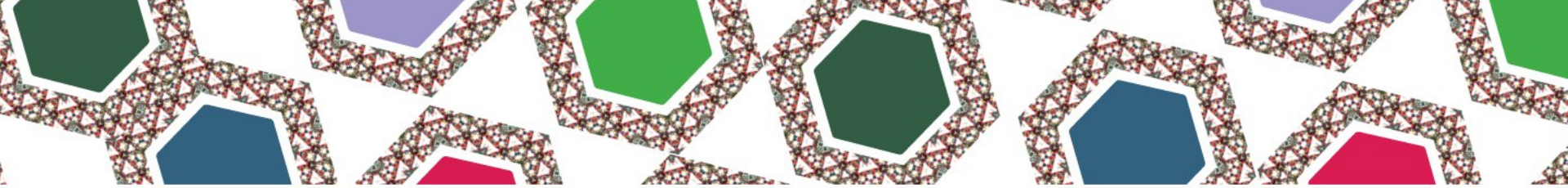


ITU Kaleidoscope 2013
Building Sustainable Communities

QOXPHERE: A NEW QOS FRAMEWORK FOR FUTURE NETWORKS

Eva Ibarrola[1], Eduardo Saiz[1], Jin Xiao[2]
Leire Cristobo[1], Luis Zabala[1]
[1] University of the Basque Country (UPV/EHU), Spain
[2] Pohang University of Science and Technology, South Korea
eva.ibarrola@ehu.es

Outline

- Introduction
- Background
- Proposal
  - QoXphere framework
  - Four layers of QoXphere
  - QoXphere dynamic behavior
  - Validation platform
- Conclusions

Introduction

- Telecom sector ➡ Significant changes
- New applications and services
- Deregulation of the market
- Complex and competitive scenario
- QoS major role

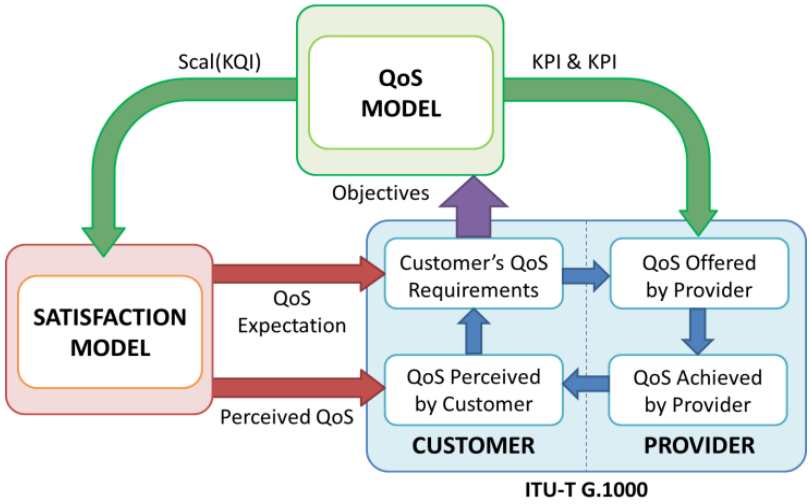
Novel QoS frameworks required!

Background

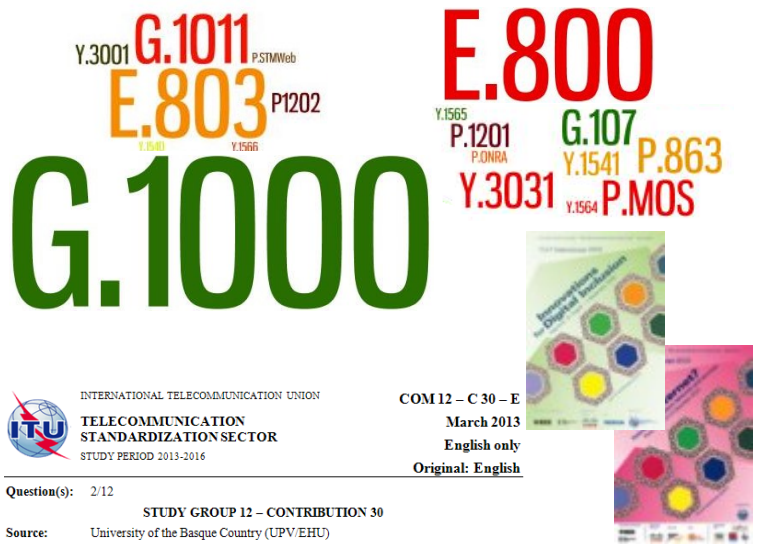
- Evolution of QoS concept
- Integration of user's point of view
- More complex analysis needed

QoS and Standards

- Standardization bodies are aware of the new QoS dimension
- QoS standards updated
- New user centric QoS standards

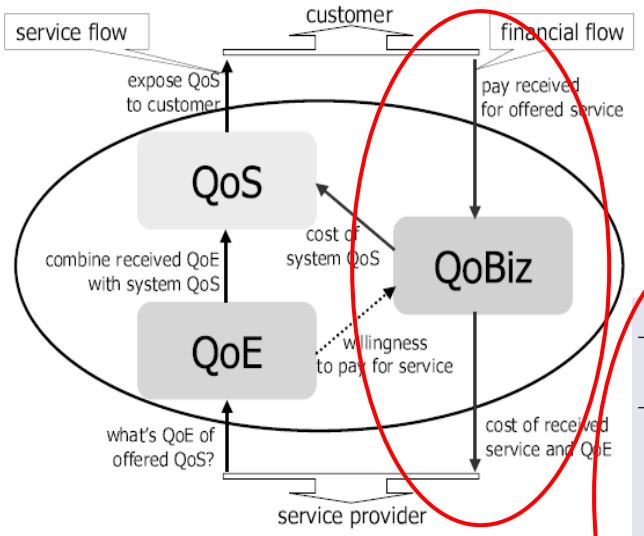


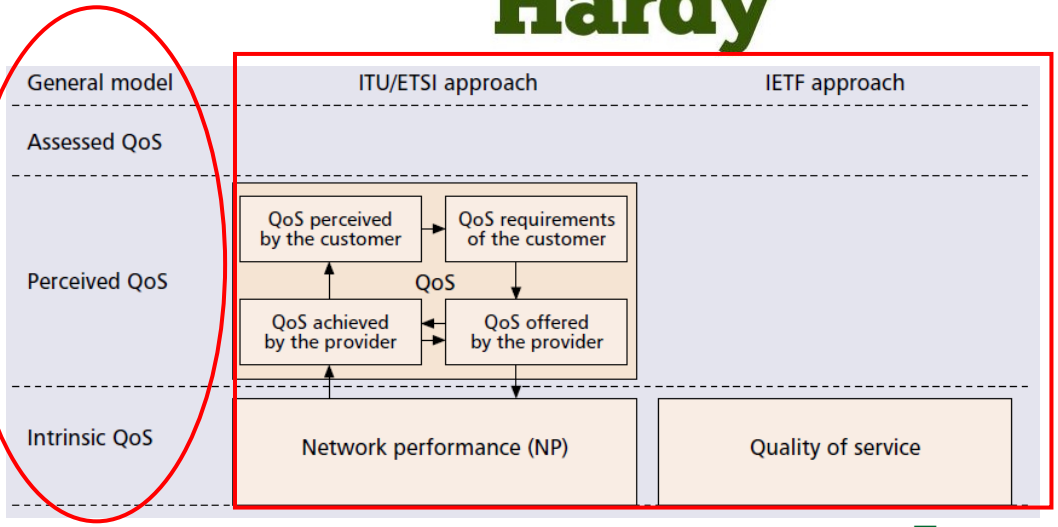
ITU-T G.1000



QoS and Research

- Stratification of the different aspects of QoS in different layers



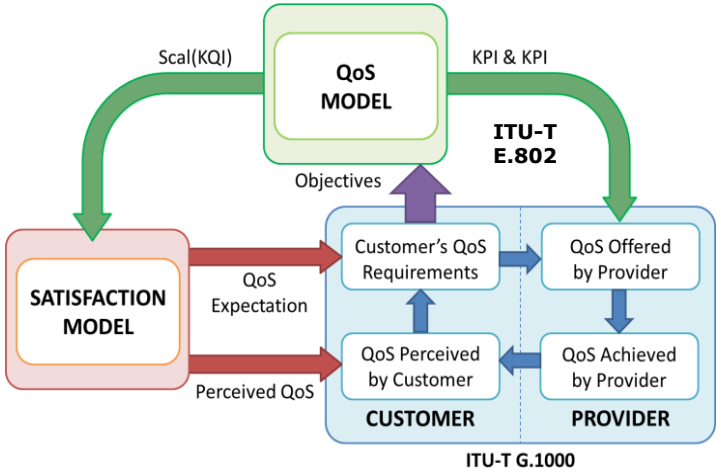


Challenges

- A new concept that will embrace the different QoS-related aspects (QoX)
- A new QoS model to link all the QoS aspects (QoX)

QoXphere

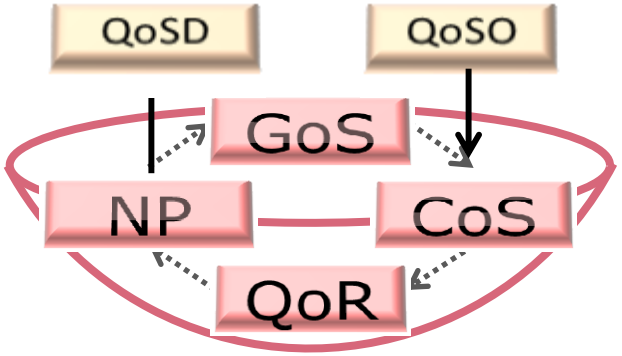
- A new QoX framework
- Spherical model



Interrelations and intra-relations between different layers

Intrinsic QoS

- Analysis of the objective QoS
  - Grade of Service (GoS)
  - Class of Service (CoS)
  - Quality of Resilience (QoR)
  - Network Performance (NP)

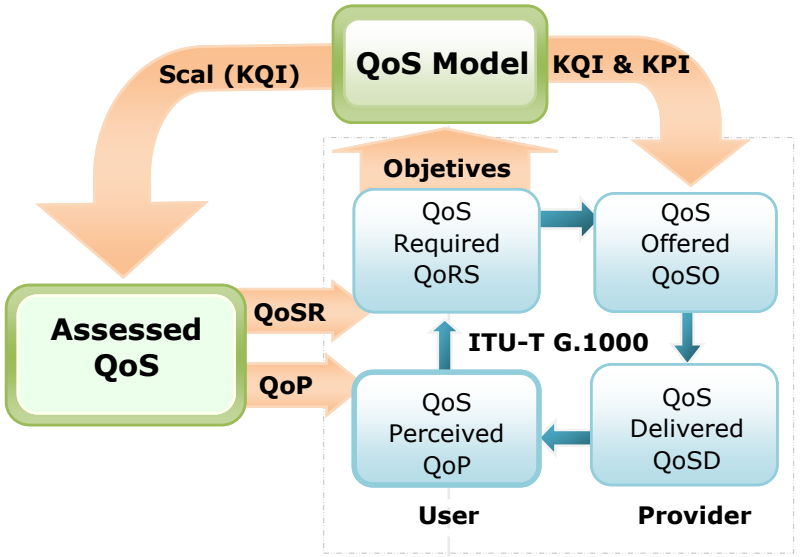


INTRINSIC QoS

- G.1010,Y.1540, Y.1541

Perceived QoS

- Based on G.1000 QoS framework
  - QoS required by user (QoSR)
  - QoS offered by provider (QoSO)
  - QoS delivered (QoSD)
  - QoS perceived (QoP)



Assessed QoS

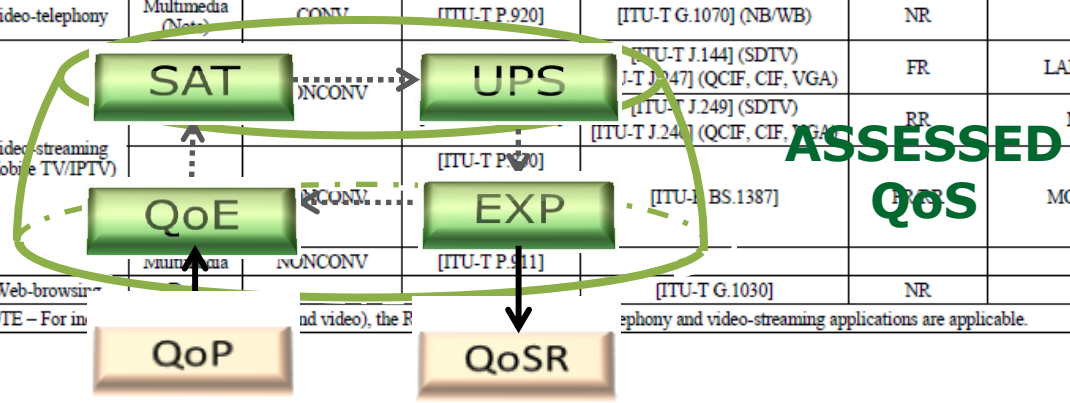
- Effect on user satisfaction
  - QoS Experienced (QoE)

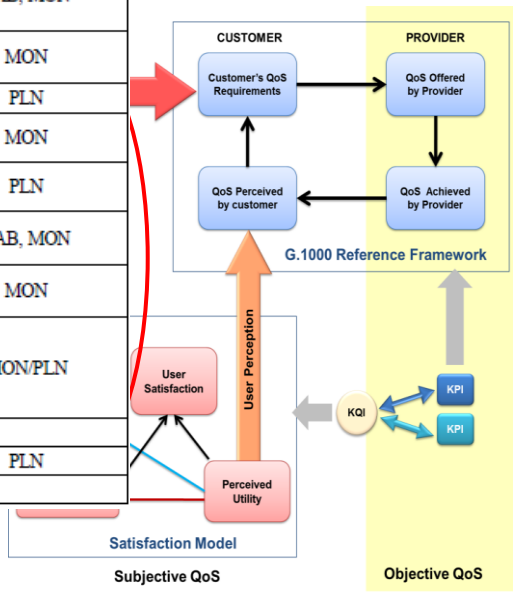
Rec. ITU-T G.1011 (06/2010)

Table 9-1 – Current ITU Recommendations for QoE assessment

Application	Media	Conversational (CONV)/Non-conversational (NONCONV)	Subjective test methodology	Objective test methodology: Model	FR/RR/NR	Primary usage
Telephony	Speech	NONCONV	[ITU-T P.800] [ITU-T P.830] [ITU-T P.835]	[ITU-T P.862] + [ITU-T P.862.1] (NB) [ITU-T P.862.2] (WB)	FR	LAB, MON
				[ITU-T P.563] (NB) [ITU-T P.564] (NB/WB)	NR	MON
		CONV	[ITU-T P.800] [ITU-T P.805]	[ITU-T G.107] (NB)	NR	PLN
				[ITU-T P.561] + [ITU-T P.562] (NB/WB)	NR	MON
Video-telephony	Multimedia (Note)	CONV	[ITU-T P.920]	[ITU-T G.1070] (NB/WB)	NR	PLN
Video-streaming (Mobile TV/IPTV)		NONCONV		[ITU-T J.144] (SDTV) [ITU-T J.247] (QCIF, CIF, VGA)	FR	LAB, MON
				[ITU-T J.249] (SDTV) [ITU-T J.24[illegible]] (QCIF, CIF, VGA)	RR	MON
			[ITU-T P.[illegible]0]			
		NONCONV		[ITU-[illegible] BS.1387]	FR/RR	MON/PLN
	Multimedia	NONCONV	[ITU-T P.911]			
Web-browsing				[ITU-T G.1030]	NR	PLN

NOTE – For in[illegible] nd video), the R[illegible] ephony and video-streaming applications are applicable.

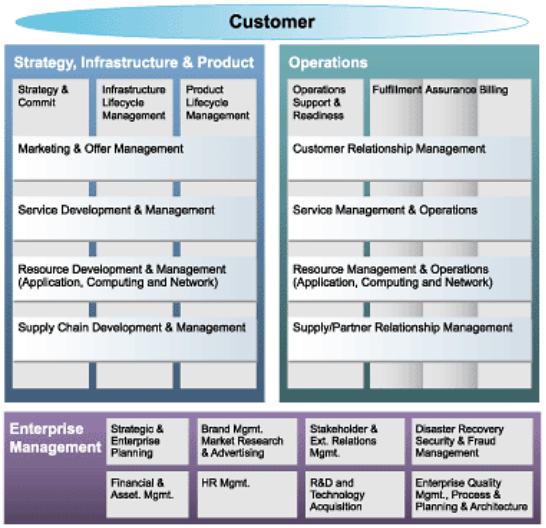


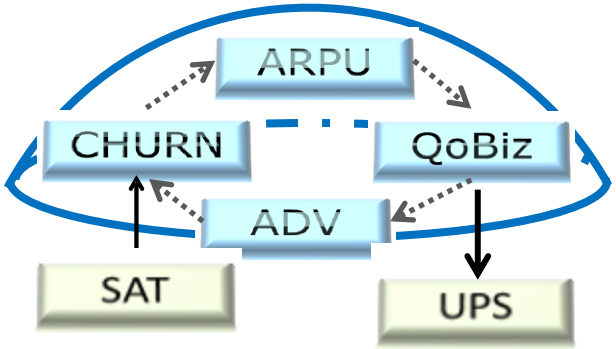


- G.1011: *"Reference guide to QoE assessment methodologies"*

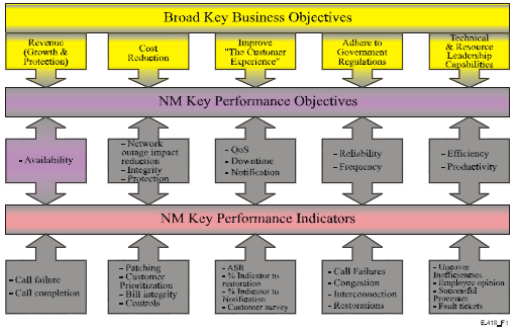
Business QoS

- Analysis of provider's profitability
  - Churn
  - ARPU (Average Revenue
  - Quality of Business (QoE
  - Advertisement



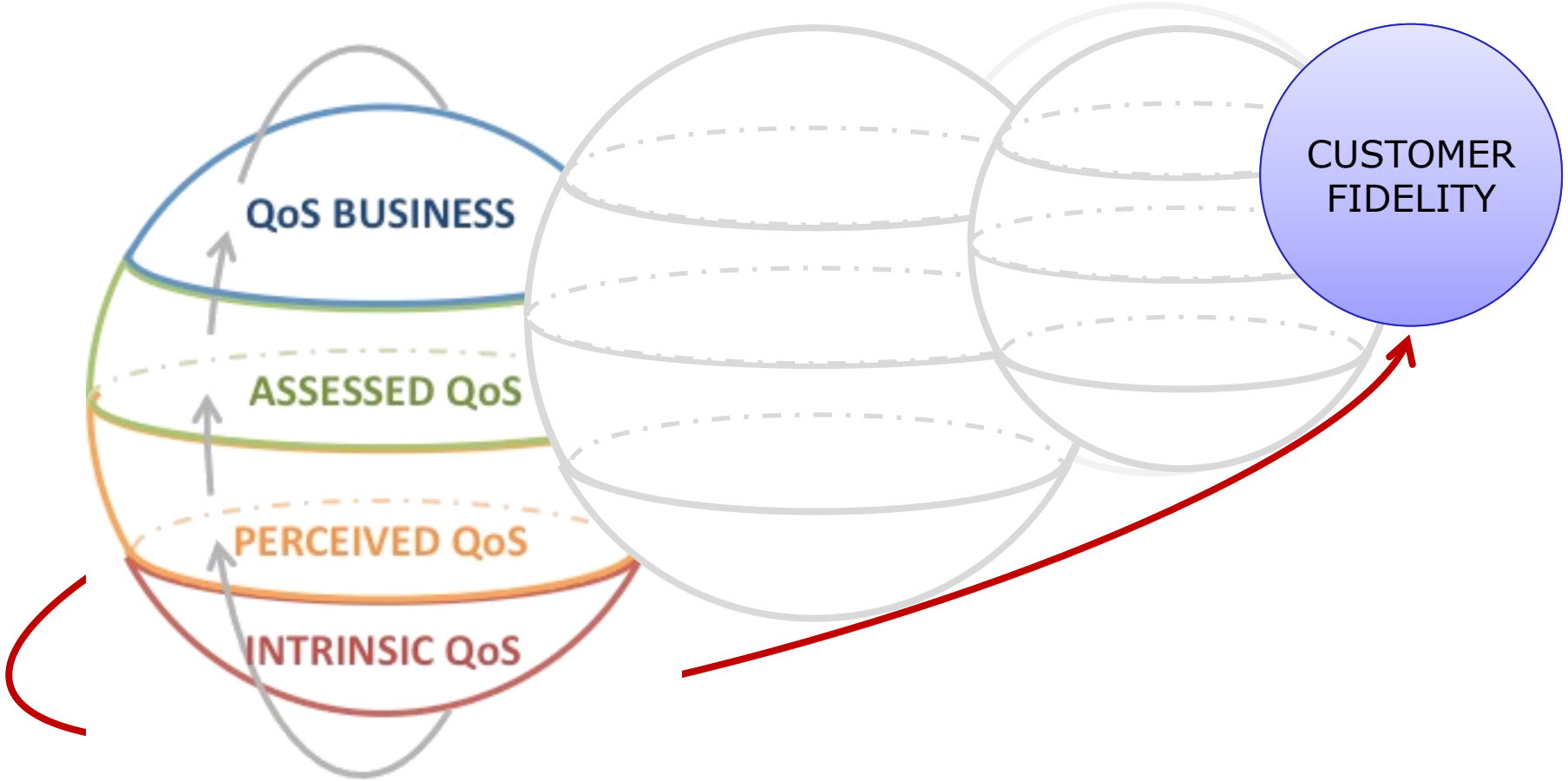


BUSINESS QoS

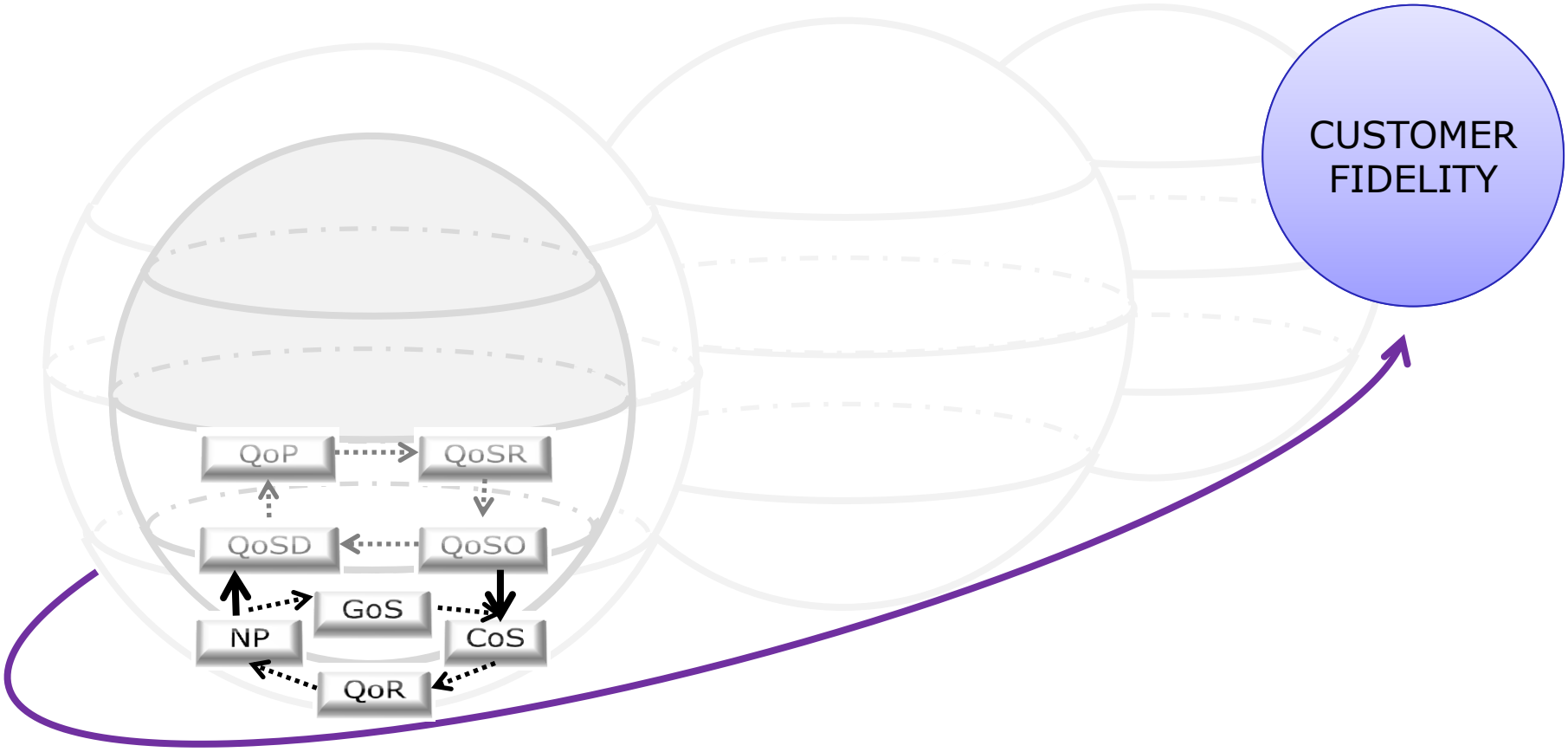


- M.3050 & E.419

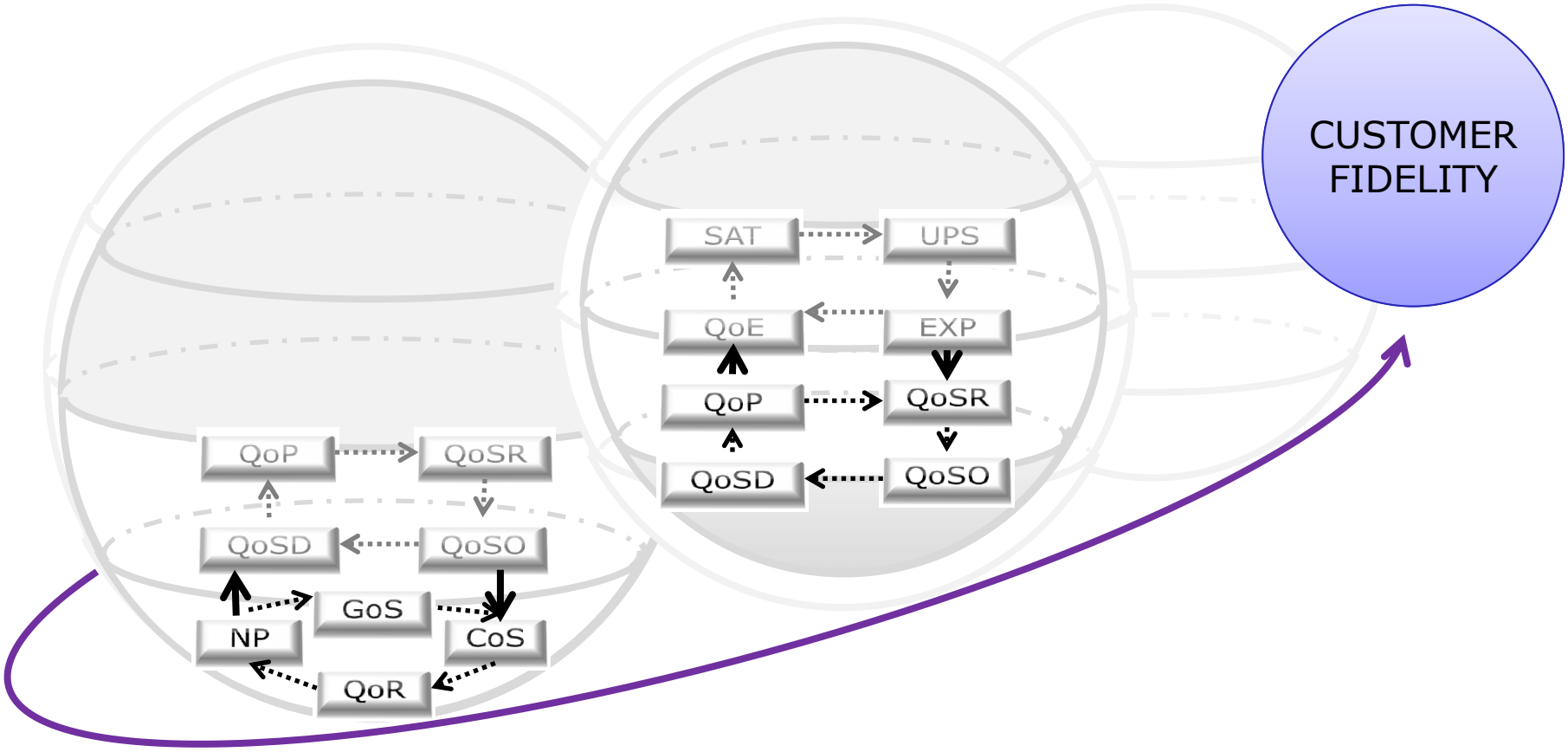
QoXphere Dynamic Behavior



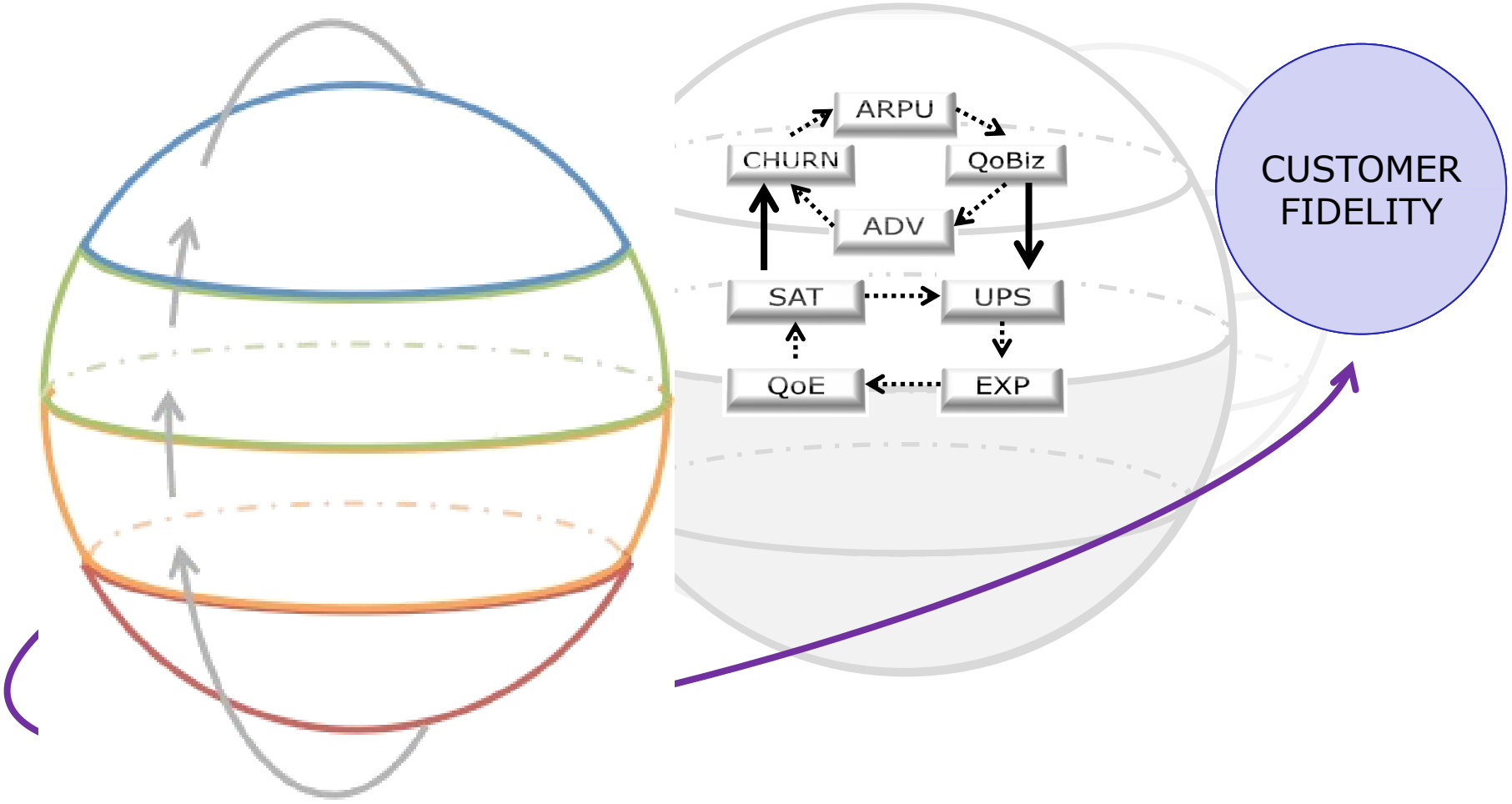
QoXphere Dynamic Behavior



QoXphere Dynamic Behavior

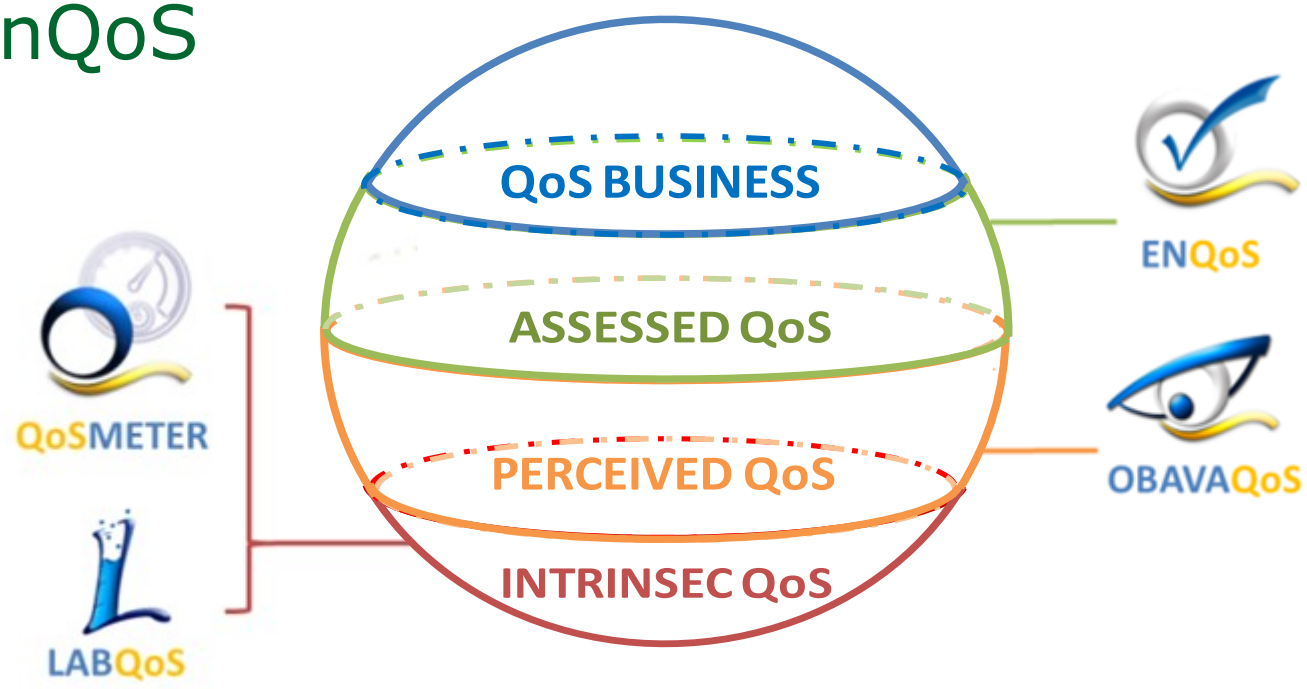


QoXphere Dynamic Behavior



QoXphere Platform

- Developed for validation of QoXphere
  - QosMeter, LabQoS
  - ObavaQoS
  - EnQoS



Conclusions

- Based on the ITU-T QoS framework
- Embraces all the aspects of QoS
- General purpose
  - User's satisfaction
  - Provider's profitability
  - Network operator's performance
- Suitable to provide new wider QoS perspective for definition of regulations in future networks

Related Contributions to Standards

- SG-11/Q.10
  "Service and networks benchmarking measurements"
  - **Draft Q.QMS**
    "Framework architecture of QoS/QoE monitoring system"
  - Based on UPV/EHU T09-SG11-C-0283 & T13-SG11-0024 contributions

- SG-12/Q.2
  "*Definitions, guides and frameworks related to QoS/QoE*"
  - **Revision of Rec. G.1000**
  - Based on UPV/EHU T13-SG12-C-0030 contribution & T13-SG12-TD-0133

ITU Kaleidoscope 2013
Building Sustainable Communities

Thank you!

Any questions?

Eva Ibarrola[1], Eduardo Saiz[1], Jin Xiao[2]
Leire Cristobo[1], Luis Zabala[1]

[1] University of the Basque Country (UPV/EHU), Spain

[2] Pohang University of Science and Technology, South Korea

eva.ibarrola@ehu.es