



Republic of Poland

Office of Electronic Communications

MONITORING AND MAPPING OF THE QOS – INITIATIVES OF THE PRESIDENT OF UKE

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ITU-EC-UKE Regional Conference for Europe
Broadband Services and Infrastructure Mapping
Warsaw, 11-12 April 2016



- Agenda

Data sources for the purposes of QoS/QoE mapping

Memorandum on cooperation for QoS in the telecommunications market

Reports on testing the quality of mobile services
- sample of mapping the results of QoS drive tests

NPK - Measurement Tool under the project on Information System on Broadband Infrastructure and the Broadband Poland portal

Dashboards for QoS analytical visualizations - case study in a nutshell



Memorandum on cooperation for QoS in the telecommunications market

Memorandum on cooperation for improving the quality of services in the telecommunications market provided to users, proposed in May 2012 by the President of UKE and eventually signed with other entities on 26 October 2012, in accordance with the provisions of the Universal Service Directive which stipulates that:

- **contracts for services** should be structured in a clear, understandable, easily accessible form,
- **published information on the quality of services** provided by telecommunications undertakings should be comparable, relevant and up to date,
- **the user shall have access to** comprehensive, comparable, reliable **information** presented in a friendly form,
- **measurable indicators of quality of service shall be identified, as well as the content, form and method of providing information to be published,**
- **minimum quality requirements** shall be identified in order to prevent deterioration of the quality of service in public networks.



UKE Report on testing the quality of mobile services

In the fourth quarter of 2015, the President of UKE carried out tests of service quality for four telecommunications operators.

The analysis was conducted across the country; most measurements were made within cities and urban agglomerations in order to reach as many consumers as possible. However, for the reason of the specificity of coverage of the respective transmitters, the results of the analysis should not be viewed as reliable for every point in Poland, nor generalized for the whole country

<http://en.uke.gov.pl/president-of-uke-presents-a-research-report-the-quality-of-mobile-phone-services-19050>

- **Use of the technology (GSM (2G), UMTS (3G), LTE (4G)) in a given area, in terms of voice and data transmission**
- **Test statistics**
 - **Voice calls**
 - **Data transfer test – Download/Upload**
 - **Delays in transmitting data packages test**
 - **Test of delay variability**
 - **Test of the reference website**
 - **YouTube Test**



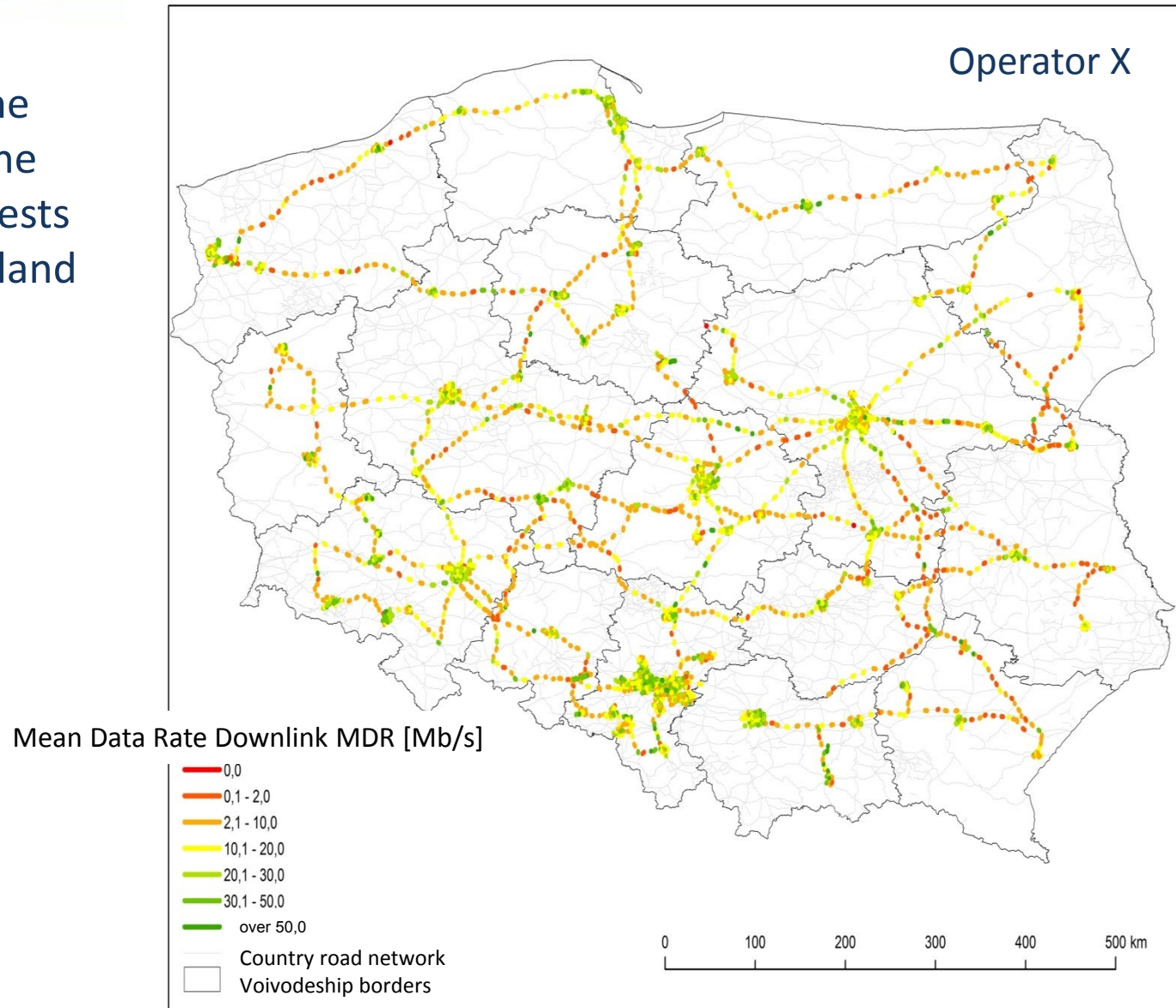
UKE Report on testing the quality of mobile services

Map of
measurement
routes in
Poland



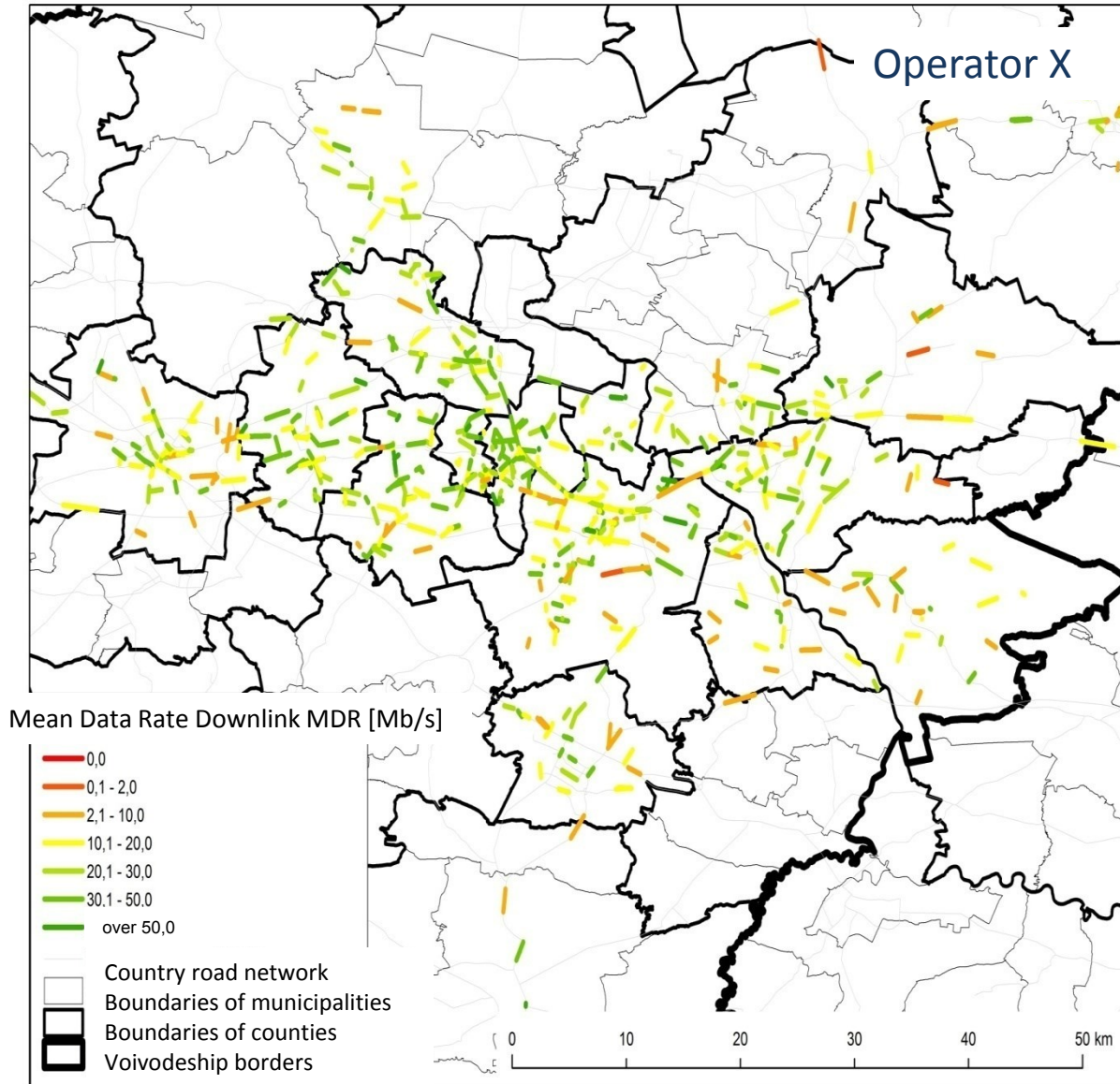


Mapping the
results of the
QoS drive tests
– whole Poland





Mapping the results of the QoS drive tests
– Katowice Region





NPK - Measurement Tool under the project on Information System on Broadband Infrastructure and the Broadband Poland portal

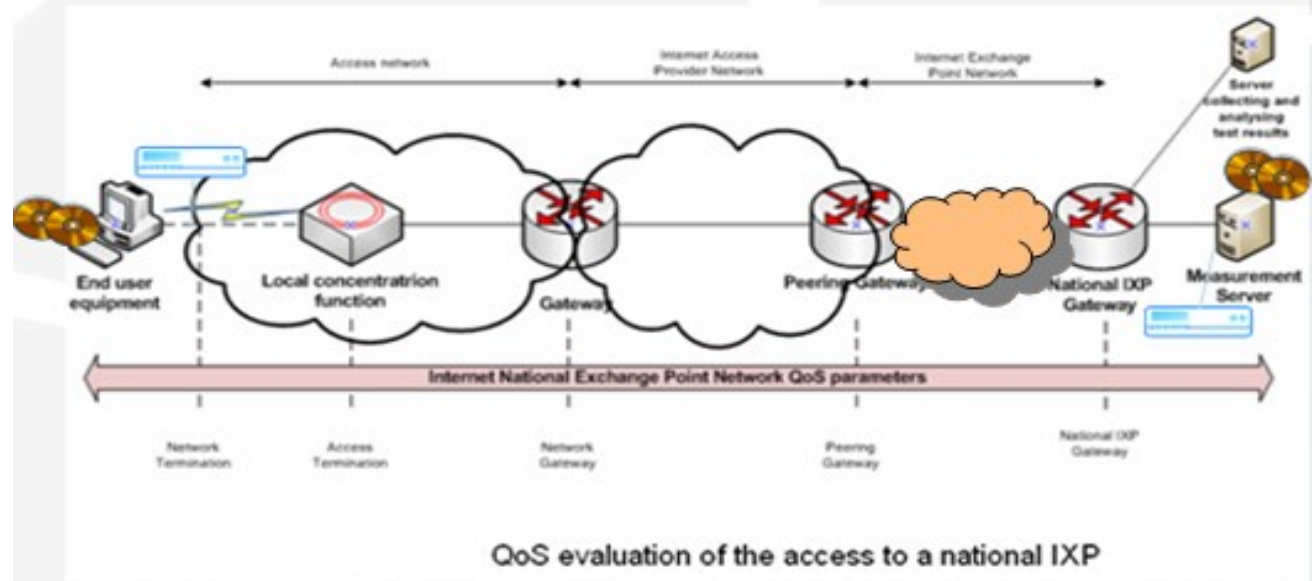
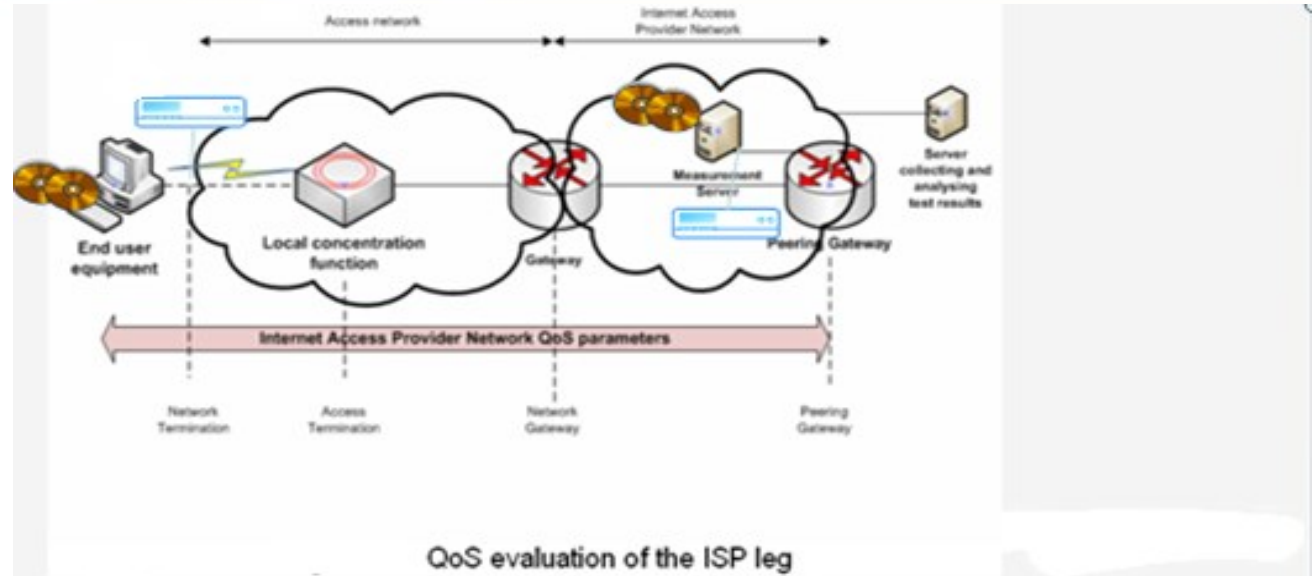
The NPK project supports the Information System on Broadband Infrastructure. The system collects the updated data related to:

- telecommunications infrastructure providing or allowing for the provision of broadband Internet access,
- main elements of public telecommunications networks providing or allowing for the provision of broadband Internet access:
 - public telecommunications network nodes,
 - transmission systems of the public telecommunications network,
 - public telecommunications networks' interconnection points,
- buildings enabling co-location



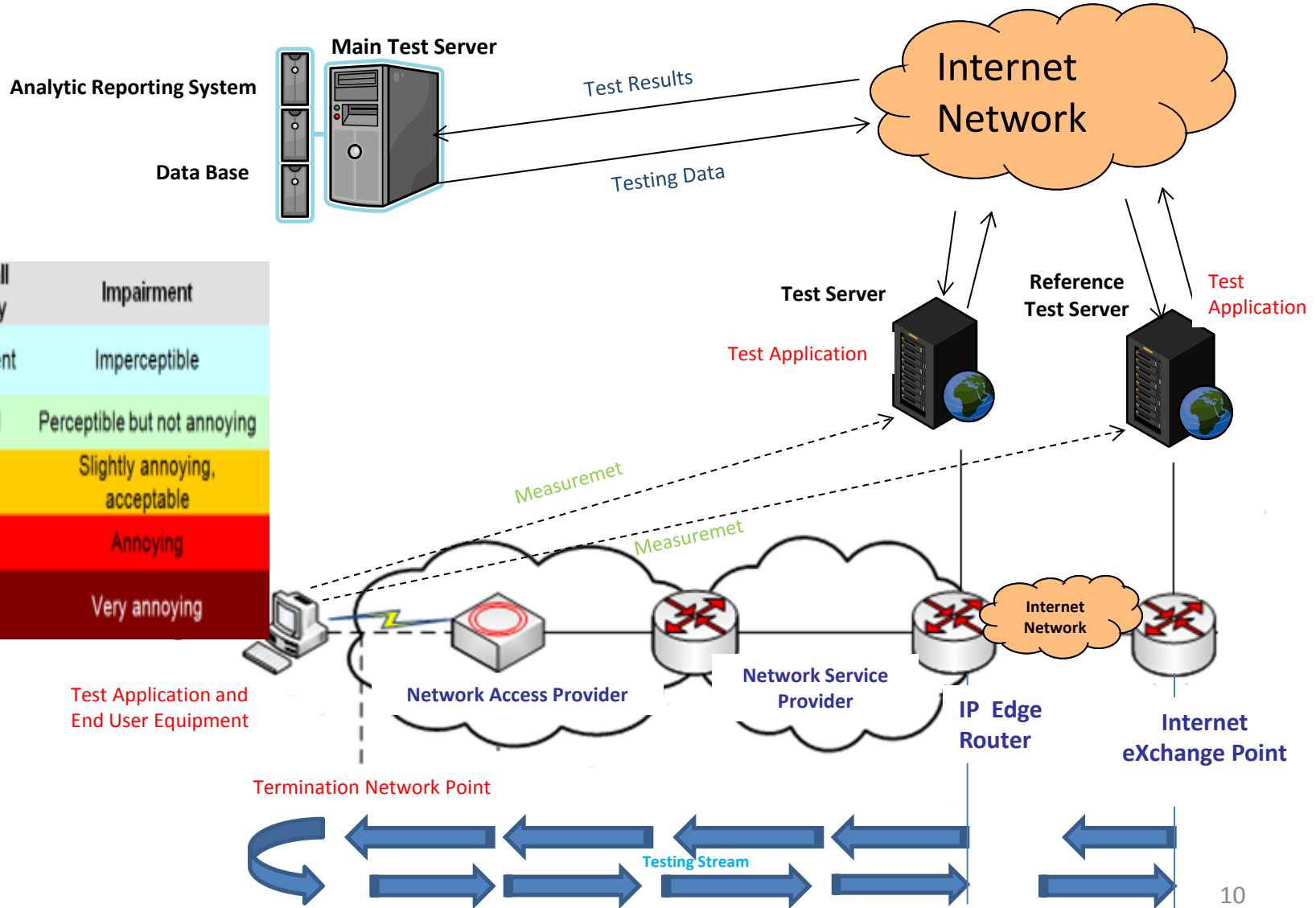
BEREC Model of QoS evaluation
of the ISP in the provision of
internet access services (IAS)

- Applications for the auditors/testers
- Measurement probes





Model of Client Application Measurement in NPK



Score	Overall quality	Impairment
5	Excellent	Imperceptible
4	Good	Perceptible but not annoying
3	Fair	Slightly annoying, acceptable
2	Poor	Annoying
1	Bad	Very annoying



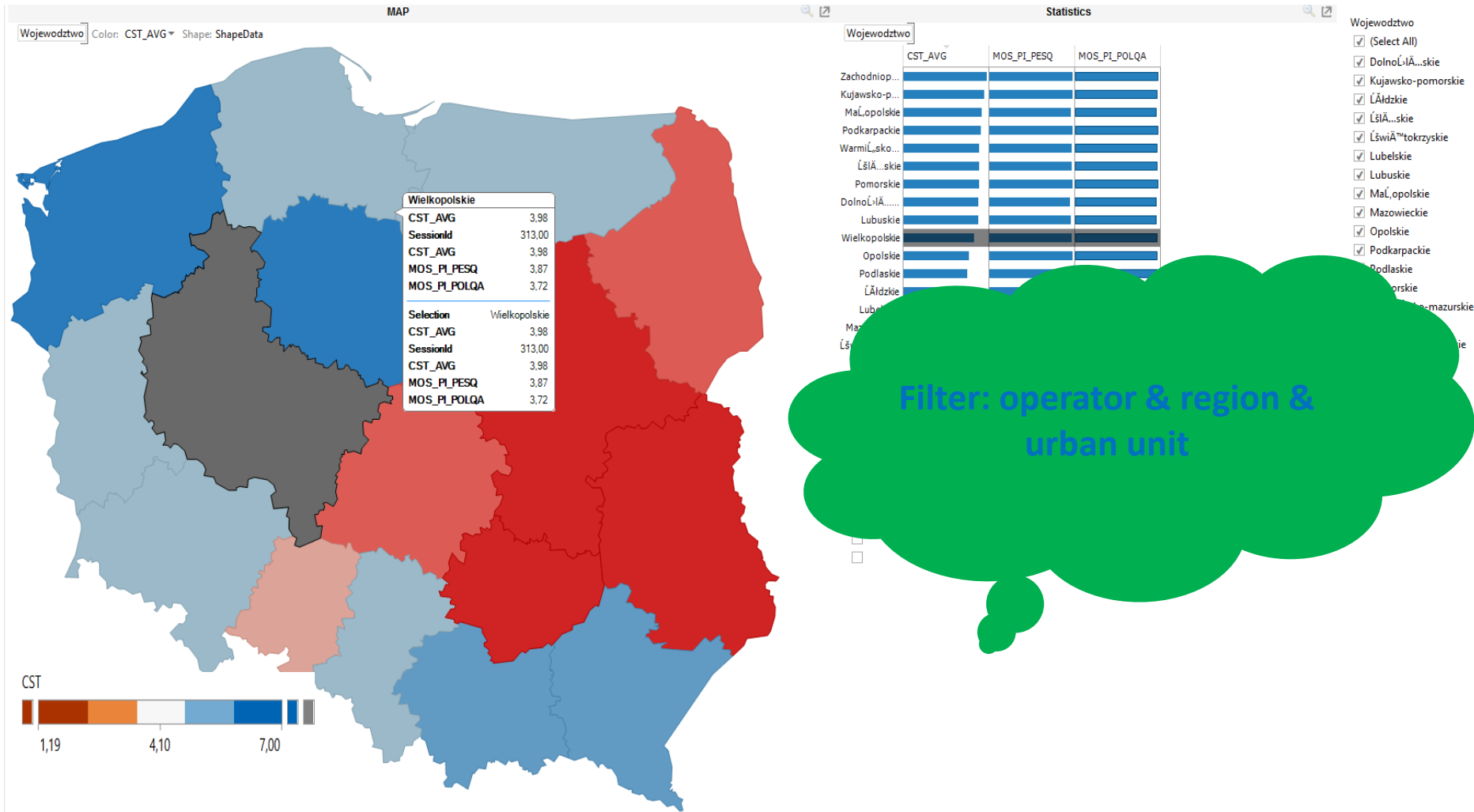
Dashboards for QoS analytical visualizations - case study in a nutshell

Observations

- 1) Starting from the loading of data through the selection of the variables and the hierarchical structures, by the analytical processing, one obtains the resultants of visualization, filtering, zooming and drilling (sometimes called slicing and dicing), to identify outliers, correlations and trends of QoS outcomes
- 2) Reports
 - ✓ profiled for QoS indicators:
 - Call Set Up Time (CST),
 - MOS (Mean Opinion Score) - PESQ (Perceptual Evaluation of Speech Quality),
 - MOS -POLQA (Perceptual Objective Listening Quality Assessment)
 - ✓ QoS indicators filtered by color, value, size and shape
- 3) Values on dashboards presented on the next few slides are based on the results of QoS drive tests. They are shown only for visualisation purposes.

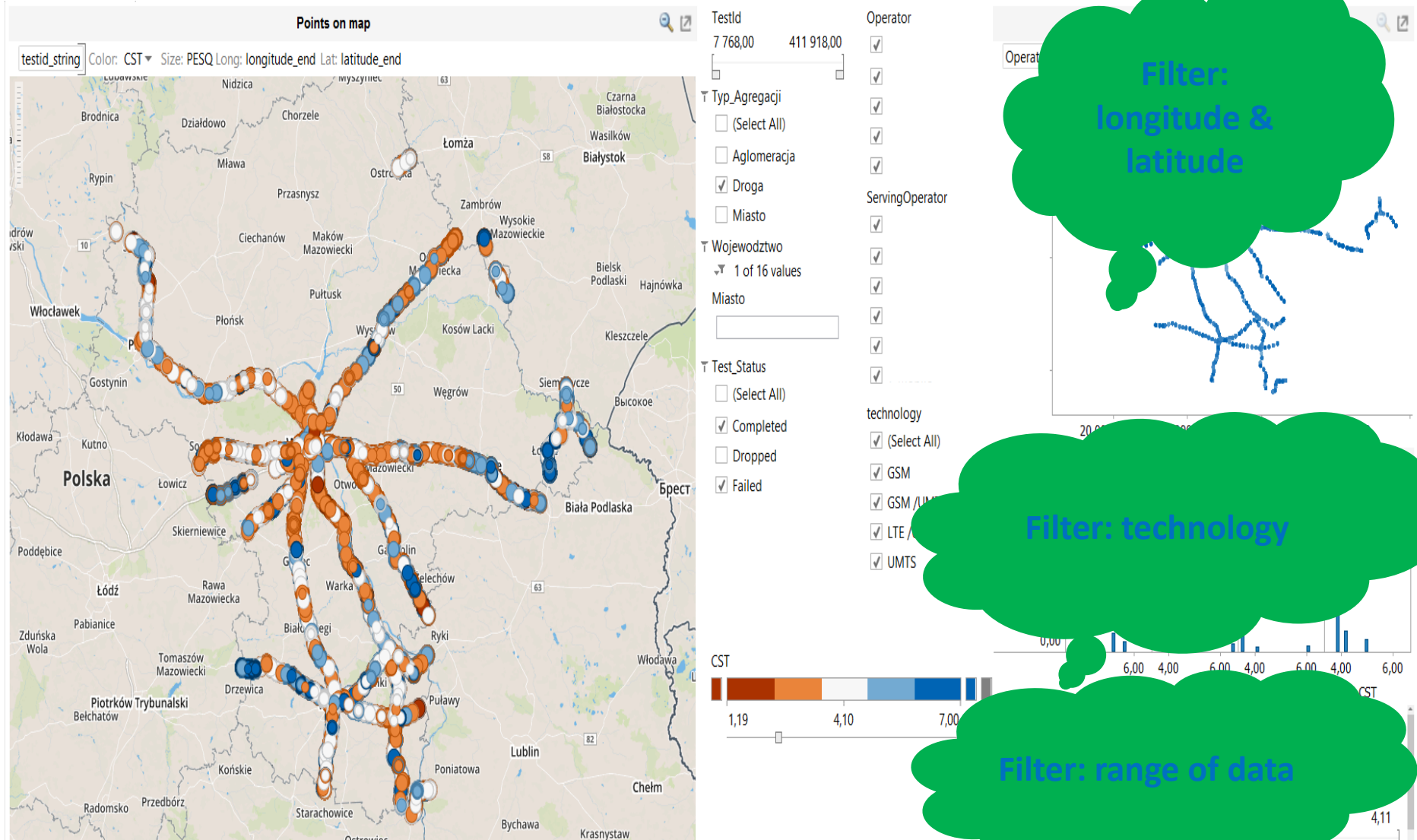


Indicators – CST (color), MOS-PESQ, MOS-POLQA (values) – by Voivodeship



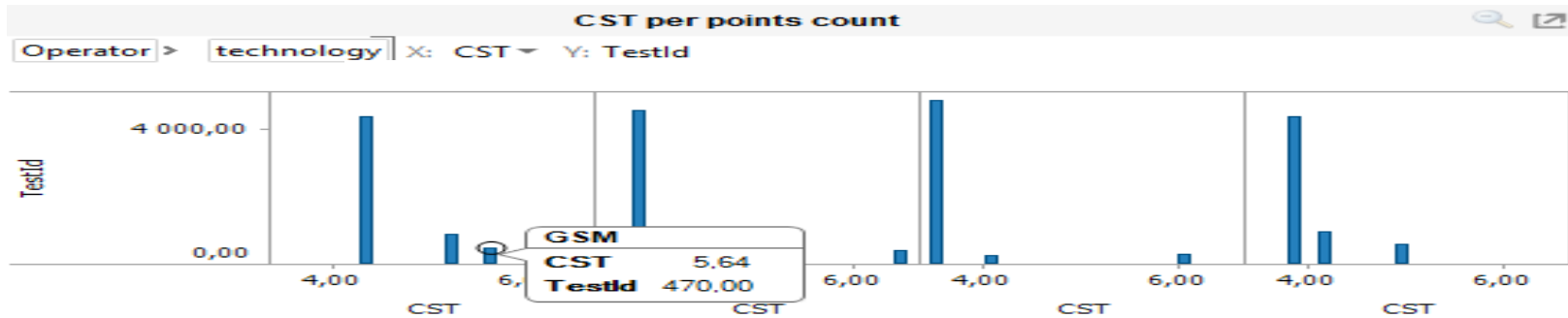
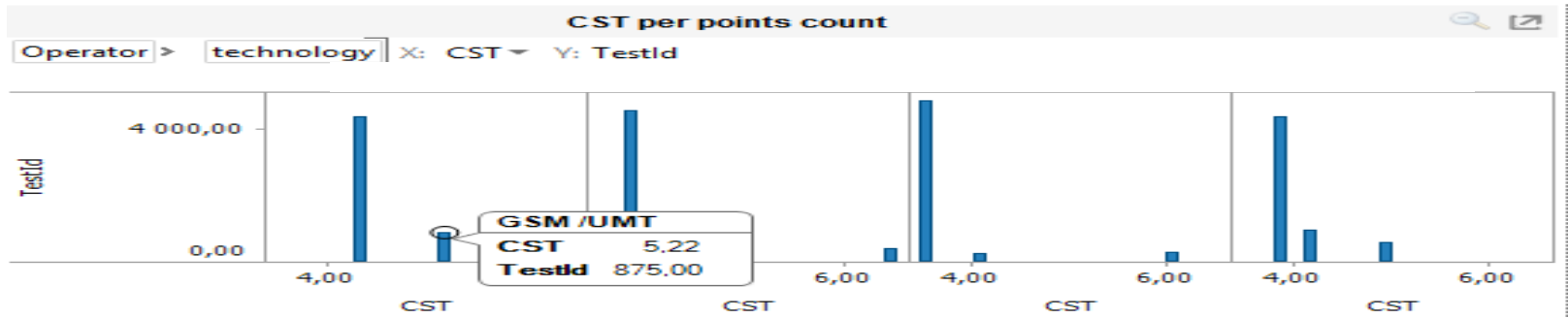
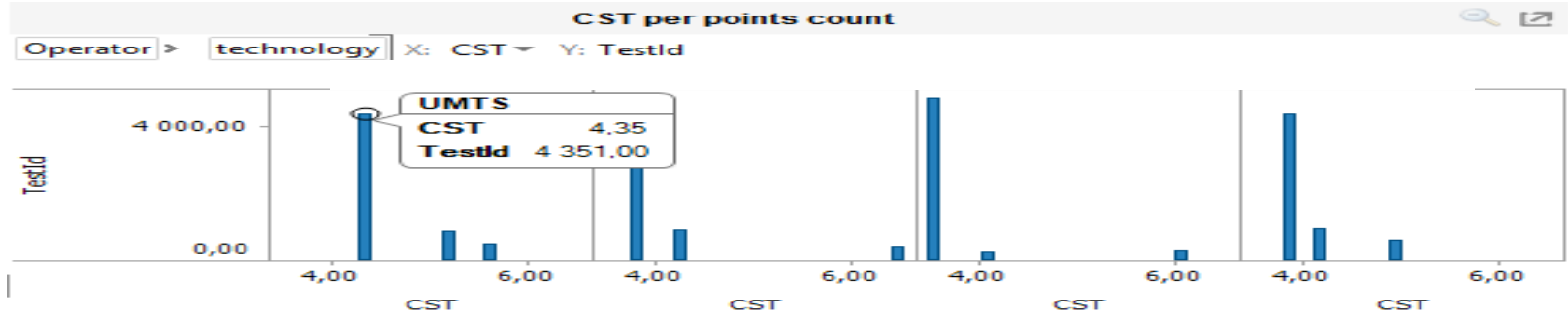


Indicators – CST (color), MOS-PESQ (size) – by urban unit & location





Indicator CST (bars) by operator & technology





Indicators – CST (size), MOS-PESQ (color) – by urban unit

Wojewodztwo Miasto Size: CST Color: PESQ

Łódzkie			Mazowieckie			Lubelskie		Podlaskie		Pomorskie	
Częstochowa CST: 4,34 PESQ: 3,86	Bielsko-Biała CST: 4,17 PESQ: 3,98	Łowicz CST: 4,09 PESQ: 3,95	Ostrowiec Świętokrzyski CST: 6,03 PESQ: 3,92	Łódź CST: 4,74 PESQ: 3,85	Radom CST: 4,70 PESQ: 3,96	Biała Podlaska CST: 6,07 PESQ: 3,92	Lublin CST: 5,67 PESQ: 3,92	Łomża CST: 5,78 PESQ: 3,92	Suwałki CST: 5,61 PESQ: 3,91	Sępólno CST: 5,86 PESQ: 3,86	Wejherowo CST: 5,66 PESQ: 3,83
Racibórz CST: 4,08 PESQ: 3,89	Rybnik CST: 4,04 PESQ: 3,86	Jaworzno CST: 4,03 PESQ: 3,91	Siedlce CST: 5,49 PESQ: 3,75	Legionowo CST: 3,76 PESQ: 3,94	Pruszków CST: 3,37 PESQ: 3,94	Chełm CST: 5,72 PESQ: 3,94	Zamość CST: 5,46 PESQ: 3,95	Białystok CST: 5,61 PESQ: 3,93		Tczew CST: 4,76 PESQ: 3,83	
Zawiercie CST: 4,05 PESQ: 3,88	Jastrzębie-Zdrój CST: 4,02 PESQ: 3,87	Tarnobrzeg CST: 3,71 PESQ: 3,90	Wielkopolskie			Łódzkie		Podkarpackie		Świętokrzyskie	
			Konin CST: 4,27 PESQ: 3,93	Gniezno CST: 3,85 PESQ: 3,95	Ostrów Wielkopolski CST: 3,85 PESQ: 3,98	Zgierz CST: 4,91 PESQ: 3,87	Piotrków Trybunalski CST: 4,63 PESQ: 3,98	Stalowa Wola CST: 4,03 PESQ: 3,93	Mielec CST: 3,71 PESQ: 3,98	Ostrowiec Świętokrzyski CST: 4,12 PESQ: 3,94	Starachowice CST: 4,09 PESQ: 3,95
Kujawsko-pomorskie			Piła CST: 4,07 PESQ: 3,96	Kalisz CST: 3,83 PESQ: 3,96	Leszno CST: 3,64 PESQ: 3,88	Bełchatów CST: 4,89 PESQ: 3,92	Pabianice CST: 4,33 PESQ: 3,94	Rzeszów CST: 3,96 PESQ: 3,96	Przemysław CST: 3,68 PESQ: 3,96	Kielce CST: 3,88 PESQ: 3,98	
Toruń CST: 6,25 PESQ: 3,87	Grudziądz CST: 6,15 PESQ: 3,82		Dolnośląskie			Małopolskie		Zachodniopomorskie			
			Jelenia Góra CST: 4,08 PESQ: 3,95	Lubin CST: 3,96 PESQ: 3,97	Głogów CST: 3,85 PESQ: 3,98	Kraków CST: 4,05 PESQ: 4,01	Nowy Sącz CST: 3,95 PESQ: 3,92	Tarnobrzeg CST: 3,64 PESQ: 3,97	Koszalin CST: 5,93 PESQ: 3,90	Stargard CST: 3,94 PESQ: 3,92	
Inowrocław CST: 6,05 PESQ: 3,82	Włocławek CST: 5,92 PESQ: 3,81	Bydgoszcz CST: 5,80 PESQ: 3,88	Warmińsko-mazurskie			Lubuskie					
			Ełk CST: 6,28 PESQ: 3,84	Elbląg CST: 5,64 PESQ: 3,81		Gorzów Wielkopolski CST: 6,04 PESQ: 3,97	Zielona Góra CST: 4,00 PESQ: 3,93				
			Legnica CST: 3,97 PESQ: 3,97	Wałbrzych CST: 3,75 PESQ: 3,93	Łódź CST: 3,73 PESQ: 3,91						
						Olsztyn CST: 5,52 PESQ: 3,78					

TestId: 7768,00 411 918,00

Operator:

Typ Agregacji: (Select All)

Miasto

Aglomeracja

Droga

Serving Operator:

Wojewodztwo: 16 of 16 values

Miasto:

Test_Status: (Select All)

Completed

Dropped

Failed

technology: (Select All)

GSM

GSM / UMT

LTE / UMT

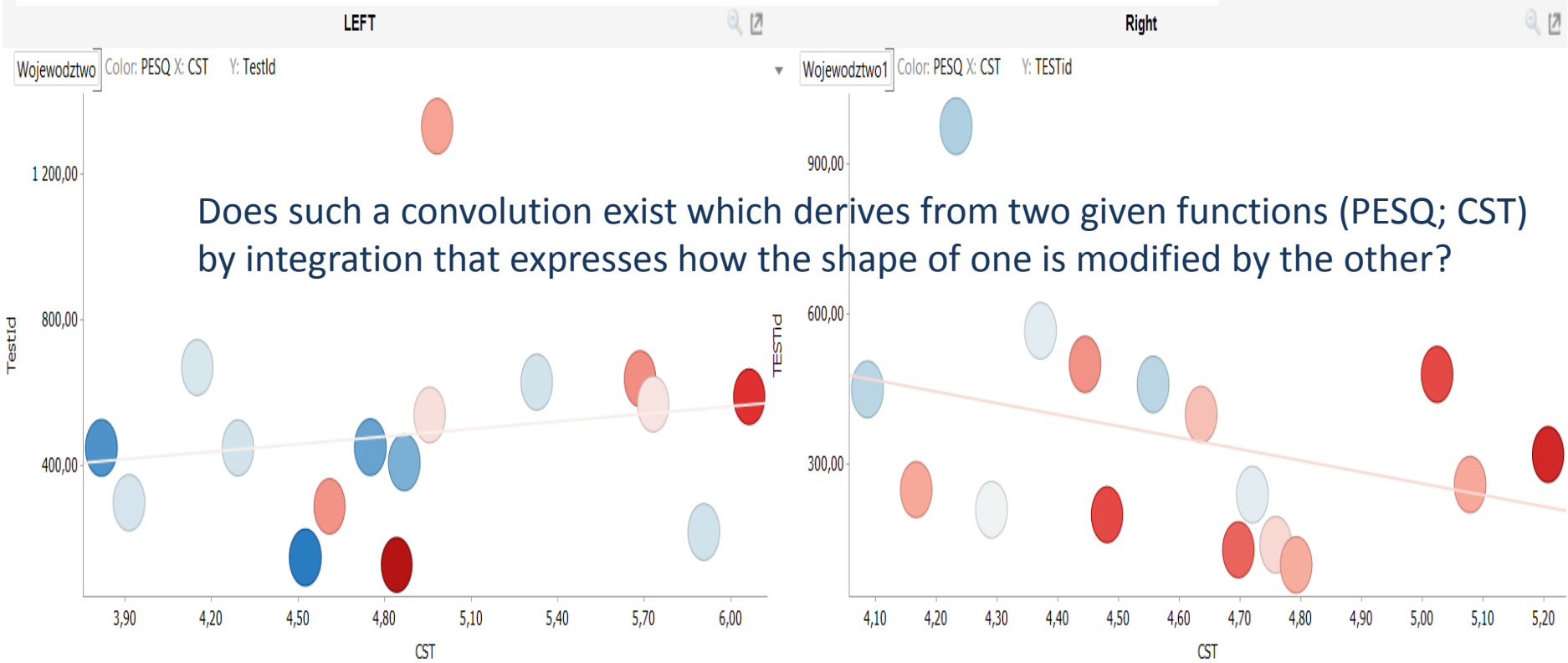
UMTS

MOS- PESQ:

Filter: operator & region & urban unit & technology



Indicators – MOS-PESQ (color), CST (value) – by urban unit



Operator

-
-
-
-
-

technology

- (Select All)
- GSM
- GSM / UMT
- LTE / UMT
- UMTS

Wojewodztwo

▼ 16 of 16 values

MOS- PESQ

3,75 3,92 4,01

Operator1

-
-
-
-
-

technology1

- (Select All)
- UMTS

Wojewodztwo1

▼ 16 of 16 values

Filter: operator & technology



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Thank you for your attention!

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