

REPUBLIC OF LATVIA PUBLIC UTILITIES COMMISSION

# LATVIAN EXPERIENCE IN QUALITY OF SERVICES MEASUREMENTS

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# QUALITY OF SERVICE MEASUREMENTS

Public Utilities Commission of Latvia  
provides Quality of Services (QoS)  
parameters measurements for:

- Voice telephony service
- Internet Access service
- TV program transmission in public networks



# VOICE TELEPHONY QoS REGULAR MEASUREMENTS

## QoS measured:

- In fixed network
- in mobile network
- “On Net” and “Off Net” using interconnection

*NOTE:*

*For fixed and mobile network measured if number of end users more than 20 000  
For interconnection measured if number of end users more than 5000 for each operator*



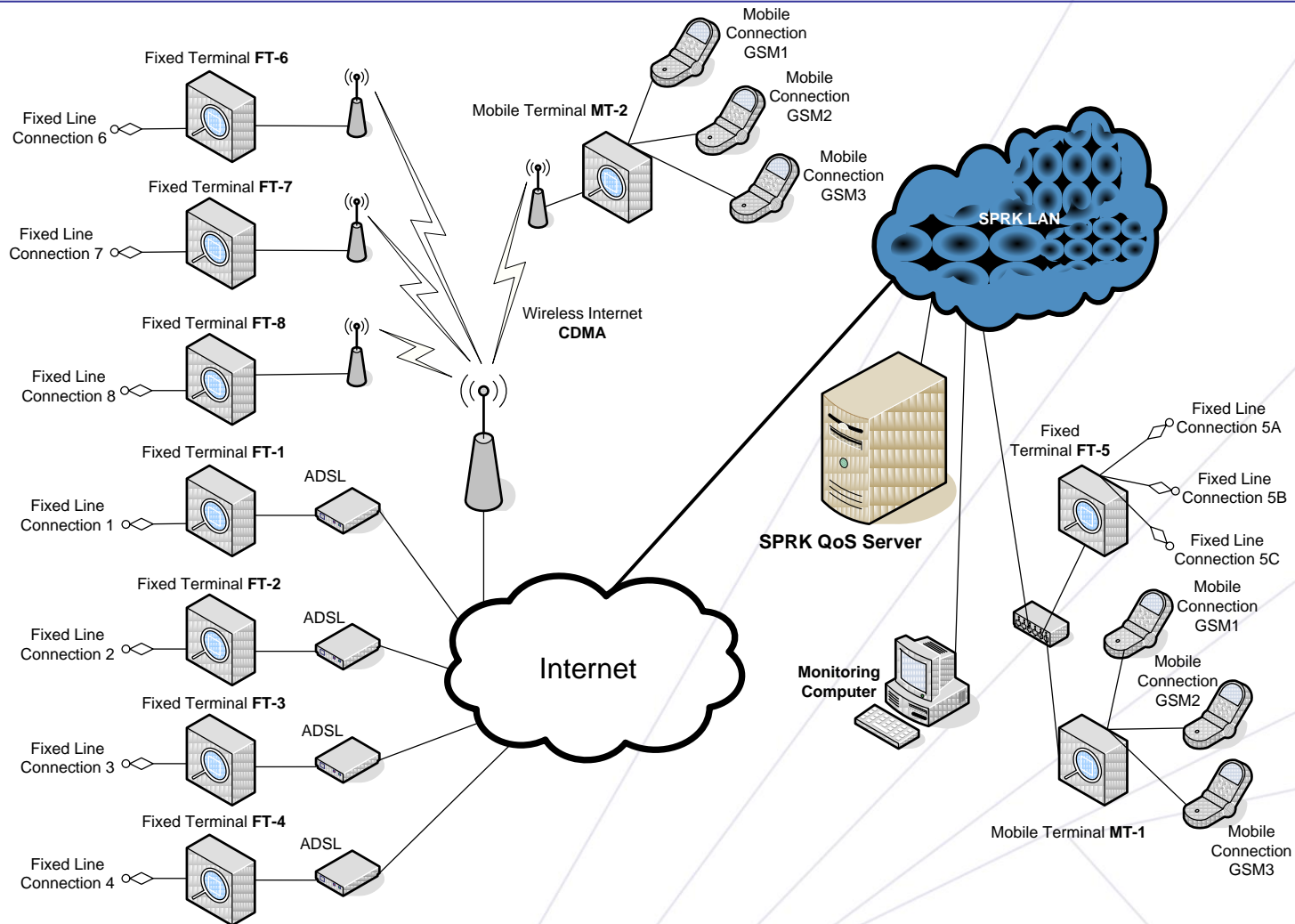
# VOICE TELEPHONY QoS MEASURED PARAMETERS

- ❑ Call setup time, [s]
- ❑ Unsuccessful call ratio, [%]
- ❑ Speech quality, [PESQ\* score]

*\*PESQ – Perceptual Evaluation of Speech Quality*

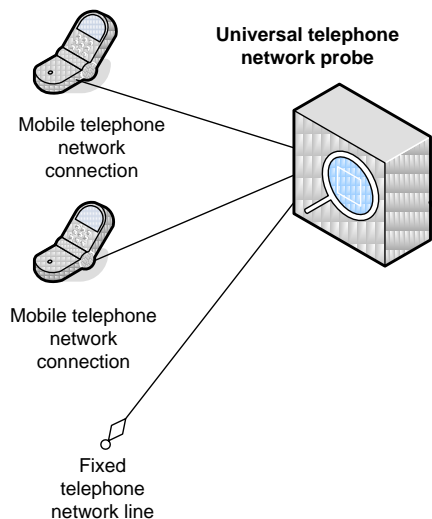


# VOICE TELEPHONY QoS MEASUREMENT SYSTEM

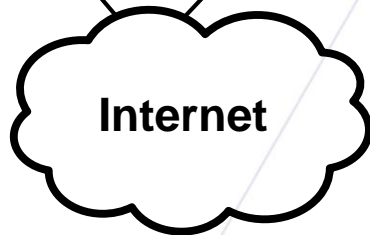
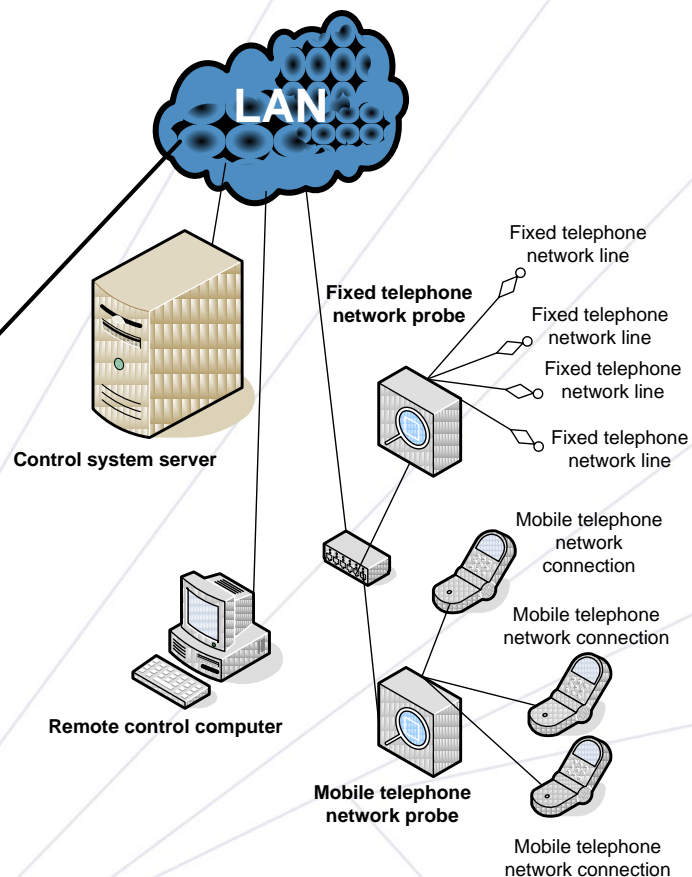


# VOICE TELEPHONY CUSTOMER COMPLAINTS MEASUREMENT TOOLS

## CUSTOMER PREMISES

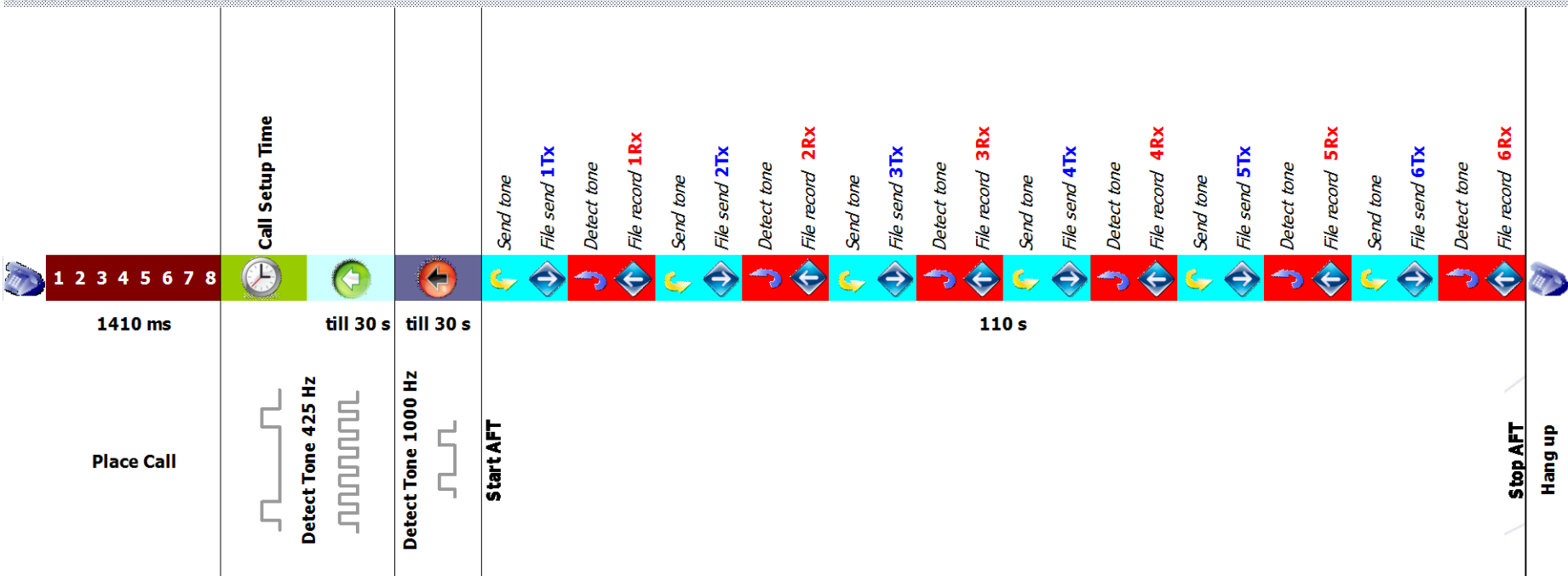


## SPRK PREMISES



# VOICE TELEPHONY MEASUREMENT TEST CALL ALGORITHM

## MASTER - Fixed network

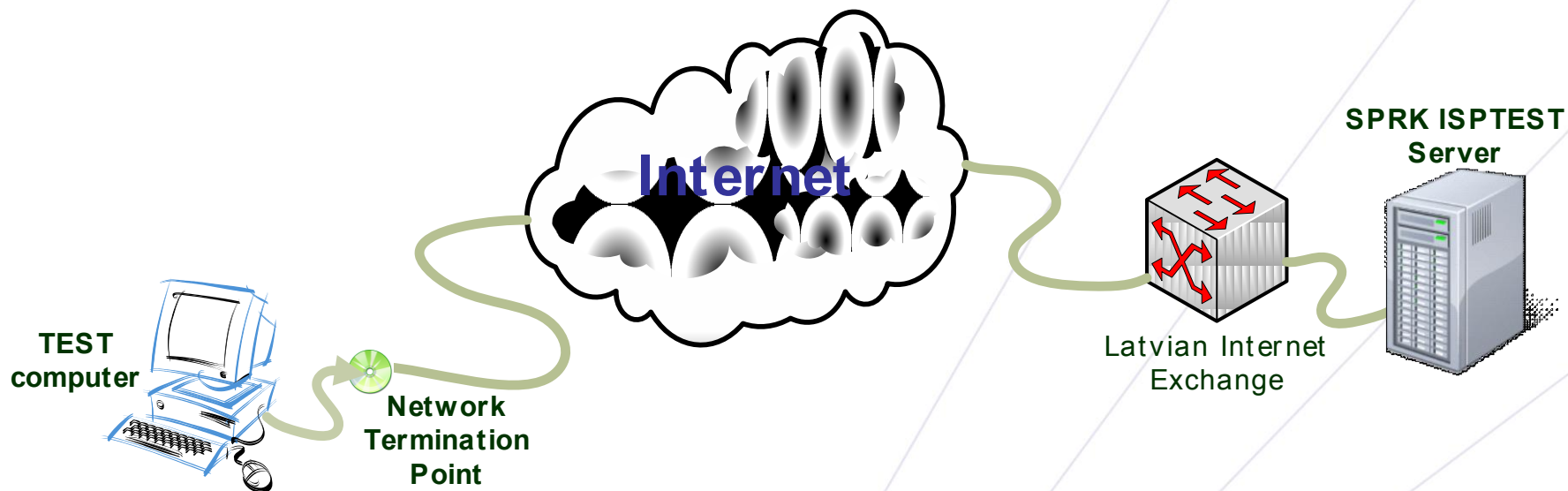


# INTERNET ACCESS QoS MEASURED PARAMETERS

- ❑ Download and upload speed, [kbps or Mbps]
- ❑ Latency, [ms]
- ❑ Jitter, [ms]
- ❑ Packet loss, [%]



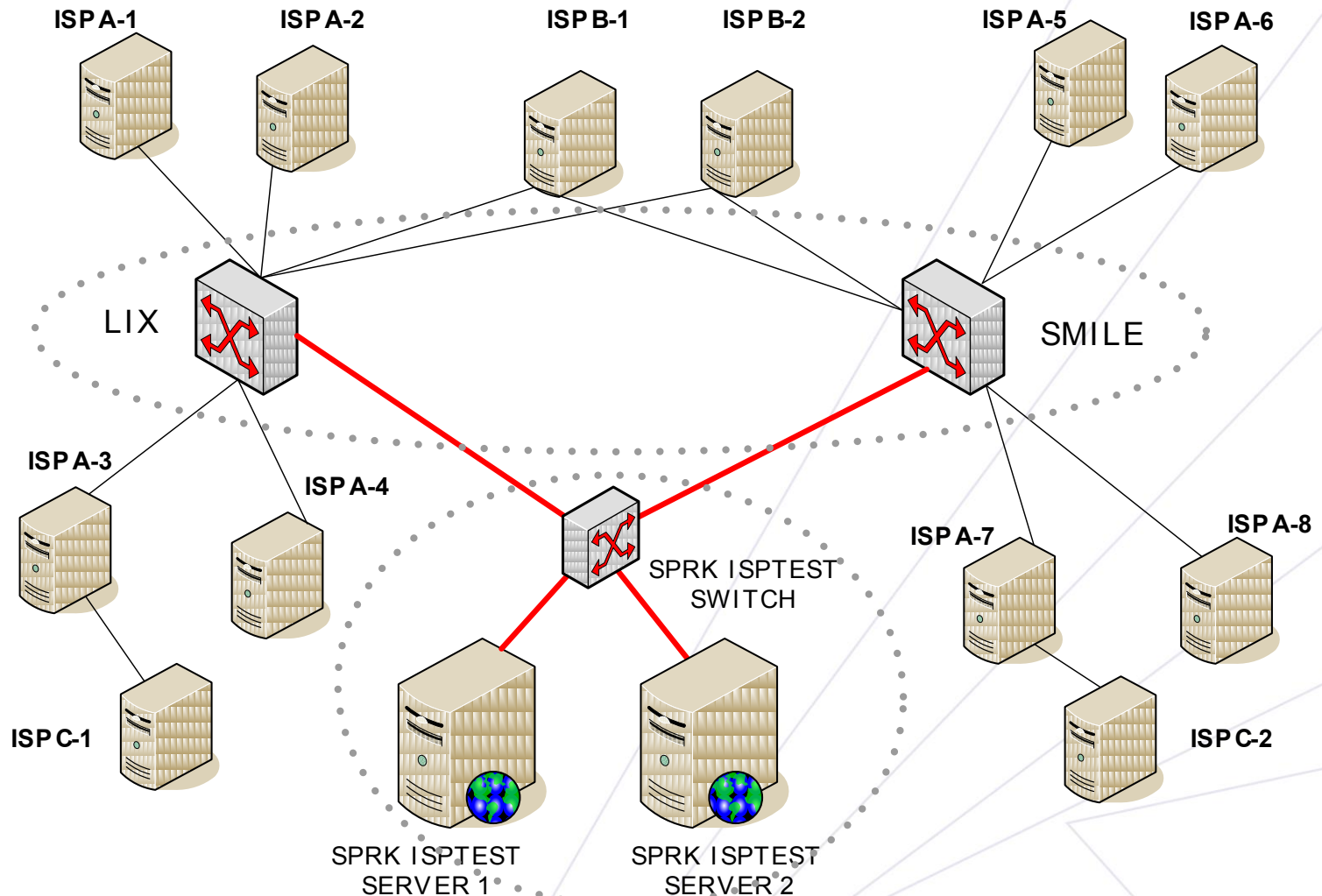
# INTERNET ACCESS QoS MEASUREMENT SYSTEM



*System engine is built as Java application with the system core from Visualware <http://www.visualware.com> (MyConnection Server BusinessCenter) and with interactive web interface which developer is a company of Latvia*



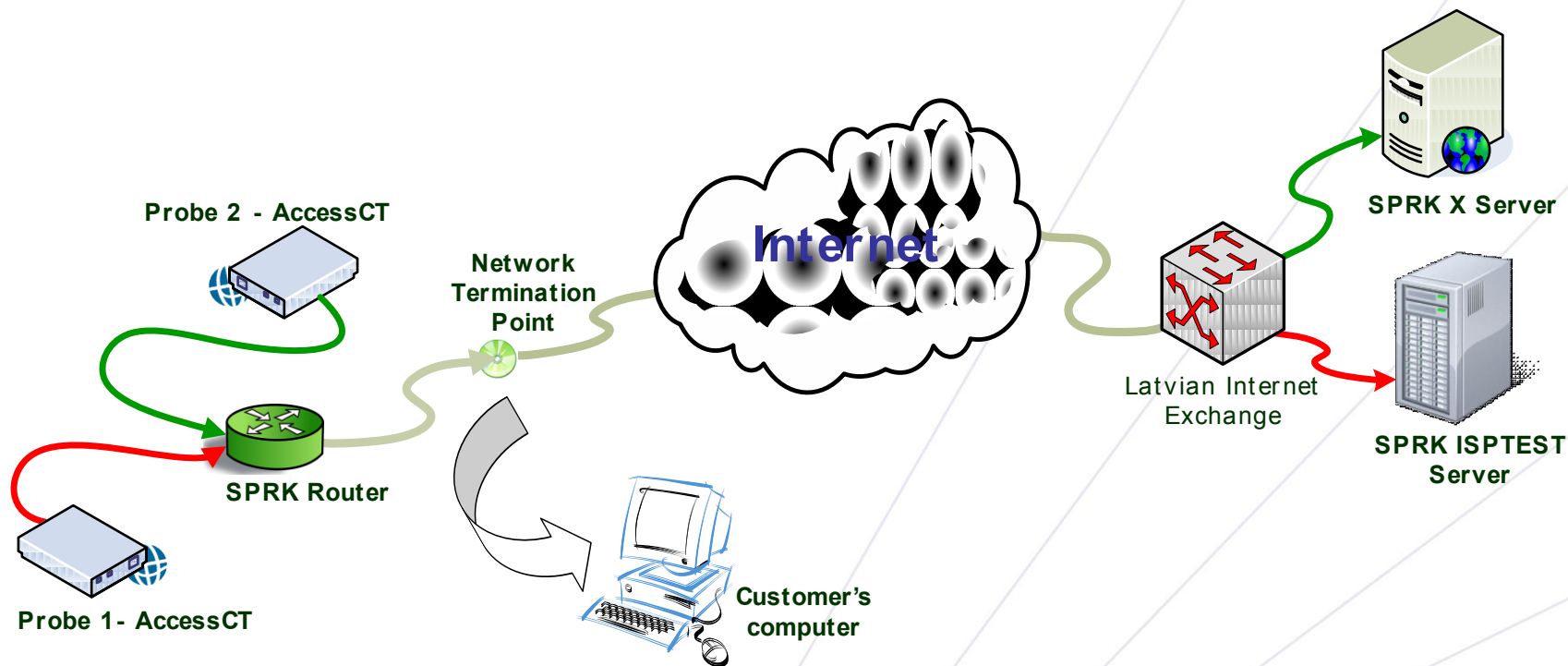
# INTERNET QoS MEASUREMENT SYSTEM ARCHITECTURE



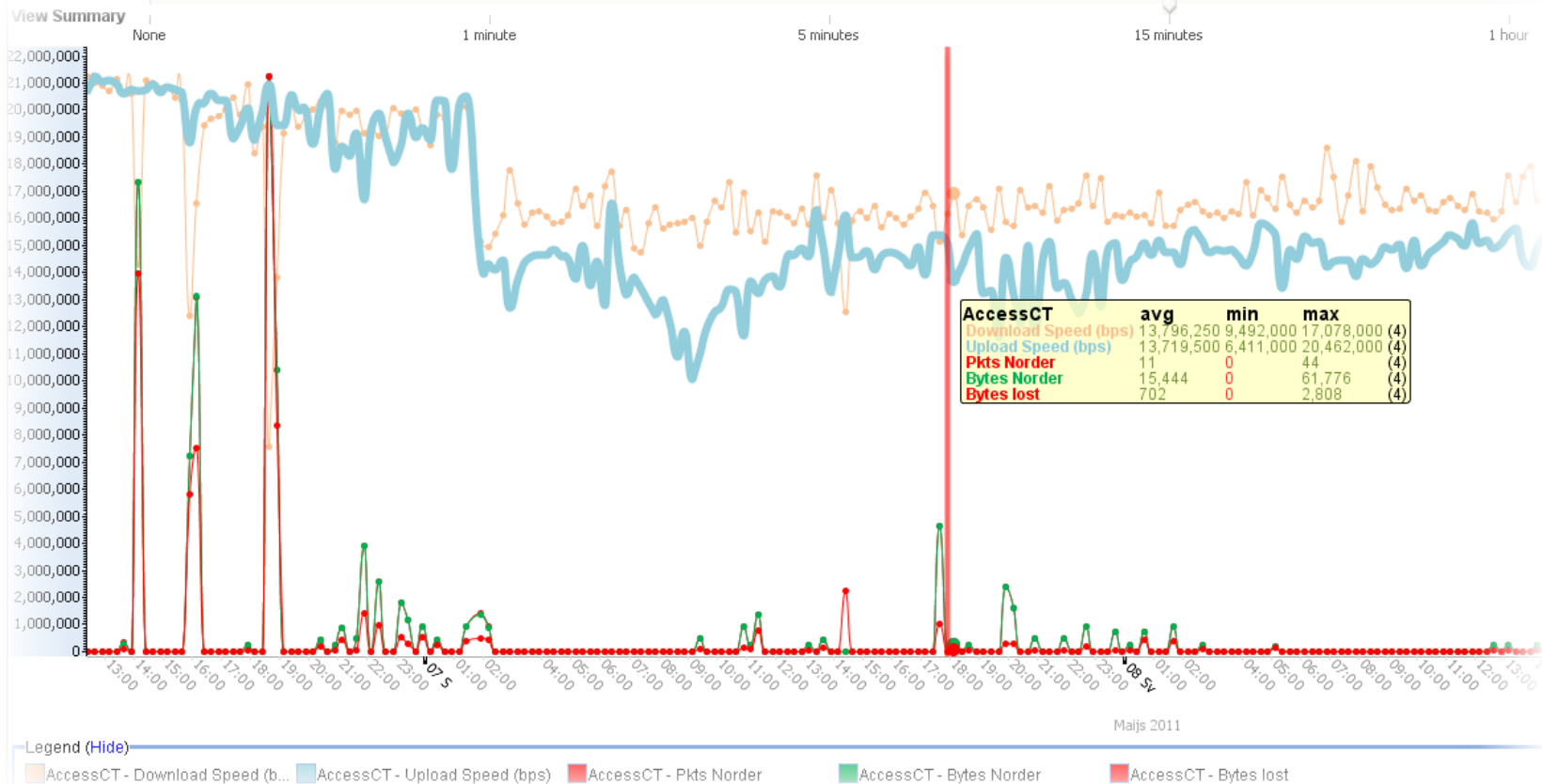
# INTERNET QoS CUSTOMER COMPLAINTS MEASUREMENTS



# INTERNET QoS MEASUREMENT PROBLEMS AND SOLUTION



# THE MEASUREMENT SYSTEM CAPABILITIES FOR DATA ANALYSIS



# **TECHNOLOGICAL PLATFORMS FOR TV PROGRAM TRANSMISSION**

- Terrestrial TV program transmission
- Satellite TV program transmission
- Cable analog and digital TV program transmission
- IPTV program transmission



# TELEVISION QoS MEASURED PARAMETERS

**For TV program transmission in public networks (all technological platforms):**

subjective assessment of the quality of television pictures

**Additional for IP TV:**

Switching time between TV channels



# TELEVISION CUSTOMER COMPLAINTS QoS MEASUREMENTS

**For TV program transmission in public networks (all technological platforms):**

- ❑ subjective assessment of the quality of television pictures
- ❑ Other parameters for example signal levels or signal spectrum depends of entity of complaint



# MEASUREMENTS FOR IP TV PROGRAM TRANSMISSION

**Using Internet QoS measurement system is possible to evaluate:**

- Video Jitter and Audio Jitter
- Video Loss and Audio Loss
- Video Packet Order and Audio Packet Order



# THE SUBJECTIVE ESTIMATION OF THE TV PICTURE QUALITY

No.	Estimation	The explanation of the estimation	Score
1.	Excellent quality	Disturbance and distortion not visible	5
2.	Good quality	Disturbance and distortion visible, but do not disturbs watching	4
3.	Fair quality	Disturbance and distortion slightly disturbs watching	3
4.	Poor quality	Disturbance and distortion disturbs watching	2
5.	Bad quality	Disturbance and distortion disturbs watching very much	1



# THE TYPICAL DISTURBANCE AND DISTORTION OF THE PICTURE

No.	TV service	Description of distortion and disturbance
1.	The analogue TV service	1.1 The movable or motionless bended structure, granular or other kind of coatings on the picture
		1.2. The irregularity of the color and brightness
		1.3. The multiplying of the picture
2.	-The digital TV service -The digital TV service using IP	2.1. The total or short term stiffing of the picture
		2.2. The disappearance of particular parts of the picture
		2.3. Artifacts of the picture
		2.4. The distortion of vertical lines in the right side of the picture
		2.5. The drifting of sound and picture in time scale
		2.6. Artifacts of the sound



# THANK YOU FOR ATTENTION!

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