Tencent Media Lab

P.BBQCG study item overview

(generalities & passive tests)

VQEG meeting – June 8th, 2021

Joel Jung

Generalities

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P.BBQCG
parametric Bitstream-Based Quality assessment of Cloud Gaming services

- Study item of ITU-T SG12 / Q14

- Reference documents:
  - Draft Terms of Reference: SG12-C0530
  - Passive tests: SG12-C0529
  - Interactive tests: SG12-C0542

- Active organizations: Ericsson, Dolby, Tencent, TU Berlin, TU Ilmenau
  - P.BBQCG still open to new participants
  - Access to the database restricted to participants

Scope

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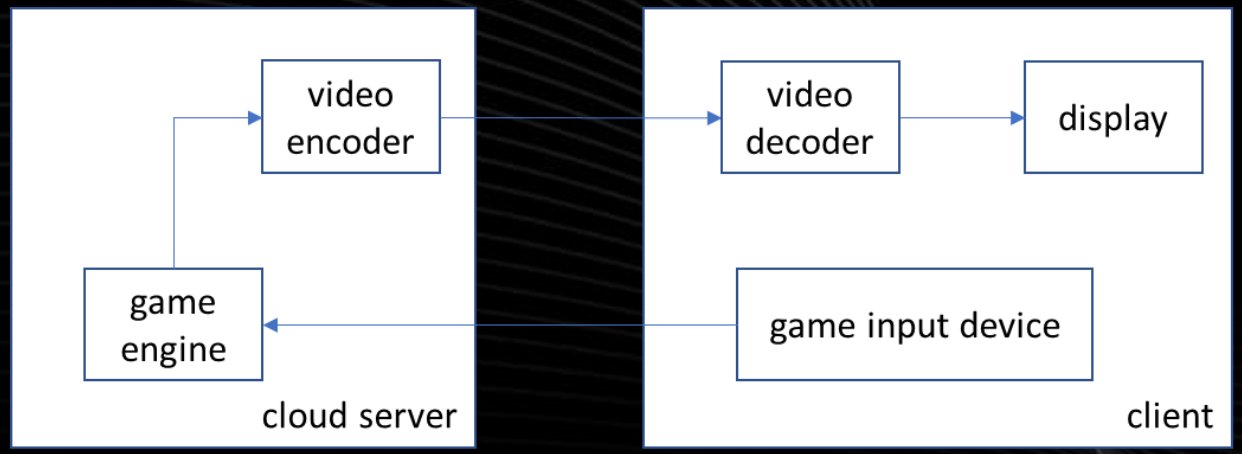
Model to monitor and predict the quality of cloud gaming services



Bitstream-based model, considering information from:

- Header and payload of packets
- Game

Passive part

- Network
- Control
- Context

Active part

No reference model

No access to decoded pixels

Application area

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Video standards	H.264, H.265, AV1
Video encoders	NVENC (H.264, H.265) – FFMPEG libaom (AV1)
Encoder configuration	Low delay P, infinite GoP
Encoder rate-control	CBR
Resolutions	540p, 720p, 1080p, 2160p
Frame rates	30fps, 60fps, 120fps
Bitrates	300 kbps to 100 Mbps
Bit depth	8 bits
Display size and resolution	27” screen size, up to 4K resolution
Sequence length	10s
Pixel format	YUV 4.2.0

(passive tests)

Description of the model

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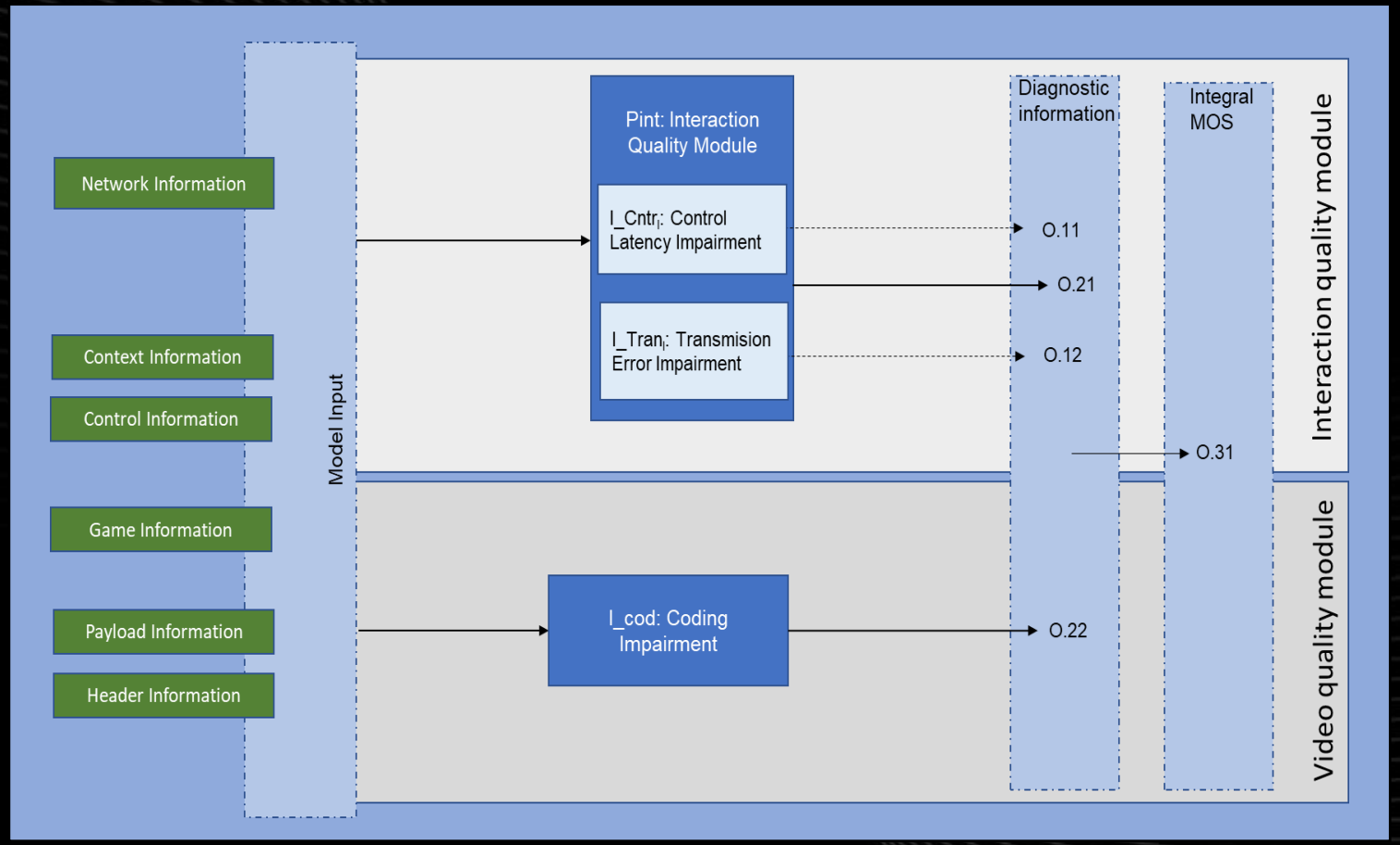
Building blocks:

2 main modules:

- interaction quality
- video quality



Description of the model

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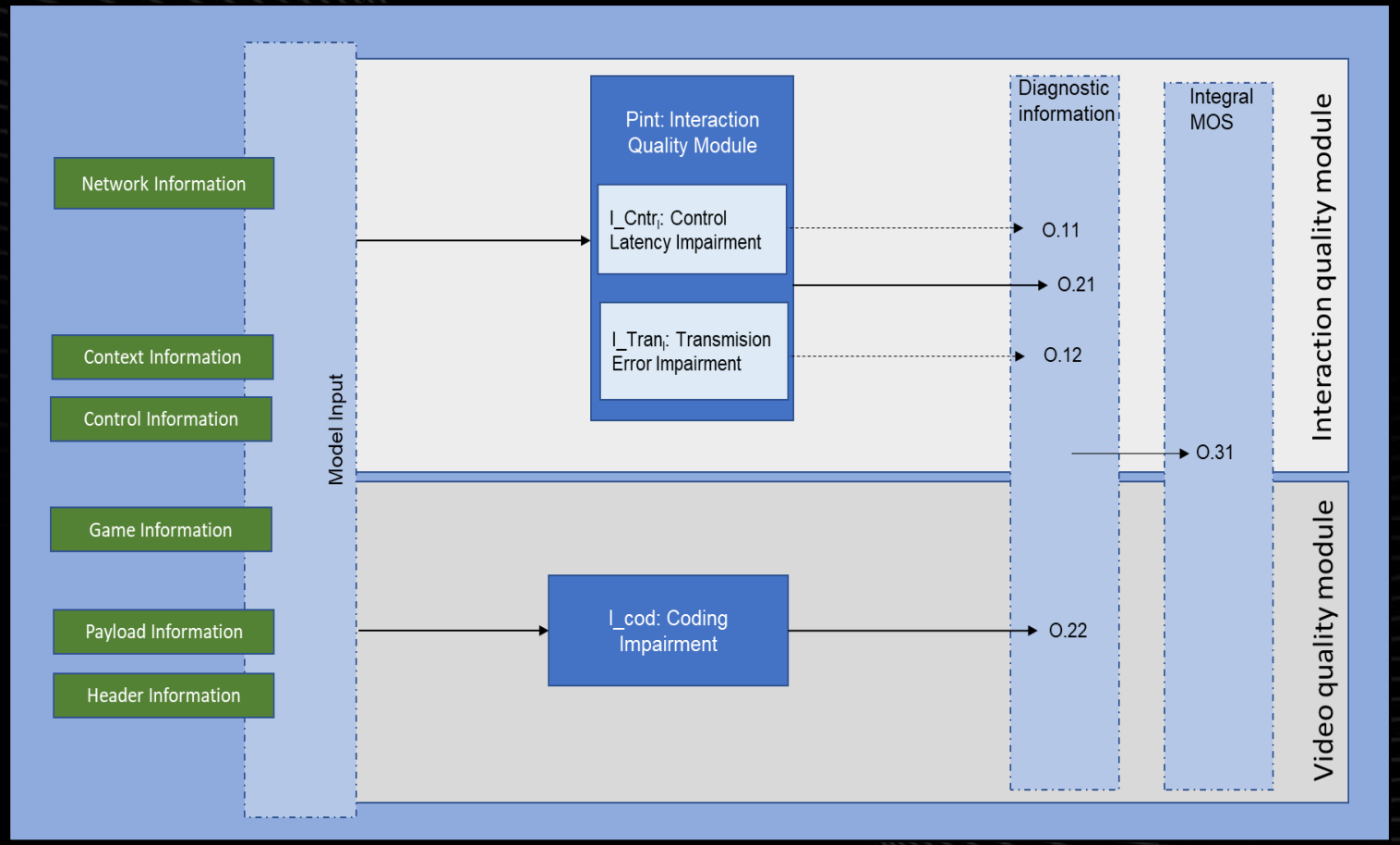
Model inputs:

- Header information (codec and profile, bitrate, coding resolution, frame-rate, size and type of frames, GoP size and structure, VPS, SPS, PPS, …)
- Payload information (quantization parameters, frame type, any other information that can be parsed from the bitstream)
- Game information (information on the game as known by the service provider)
- Network information (packet loss, jitter and network delay)
- Control information (actions performed by a player on the client device)
- Context information (device and player information)



Description of the model

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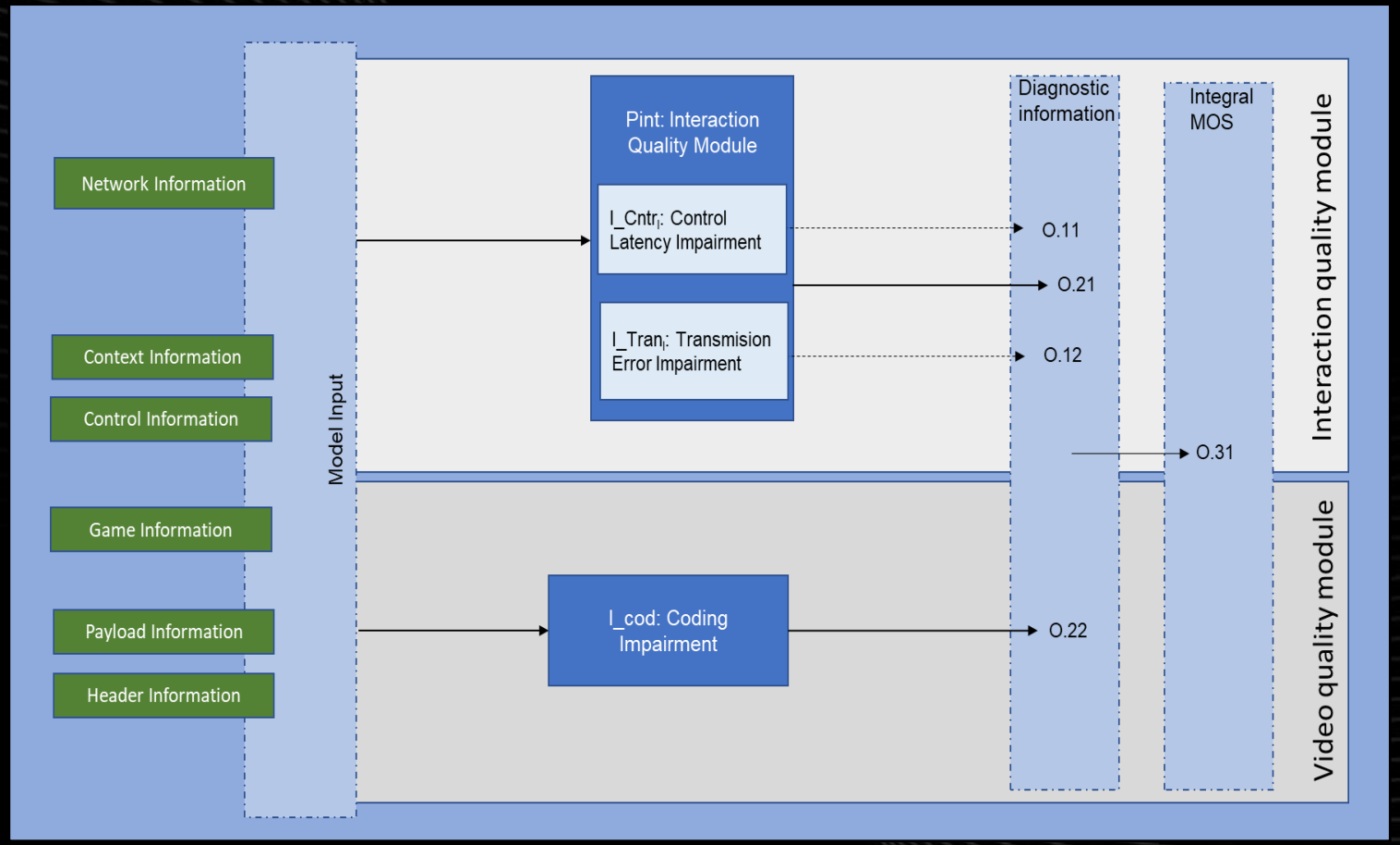
Model outputs:

- O.31: estimated overall gaming QoE
- O.22: estimated video quality impairment factor due to video compression artifacts
- O.21: estimated interaction quality factor potentially degraded due to network latency and transmission errors
- O.11: estimated interaction quality factor degraded due to network latency
- O.12: estimated transmission impairment on player interaction due to packet loss



Operating modes and anchor models

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Mode	Inputs information	Anchor
1	Header, game, context, network	P.1203.1 mode 1 post-processed by linear mapping only [P.1401]
2	Header, game, payload, network, control, context	P.1204.3 post-processed by linear mapping only [P.1401]

Model development and timeline

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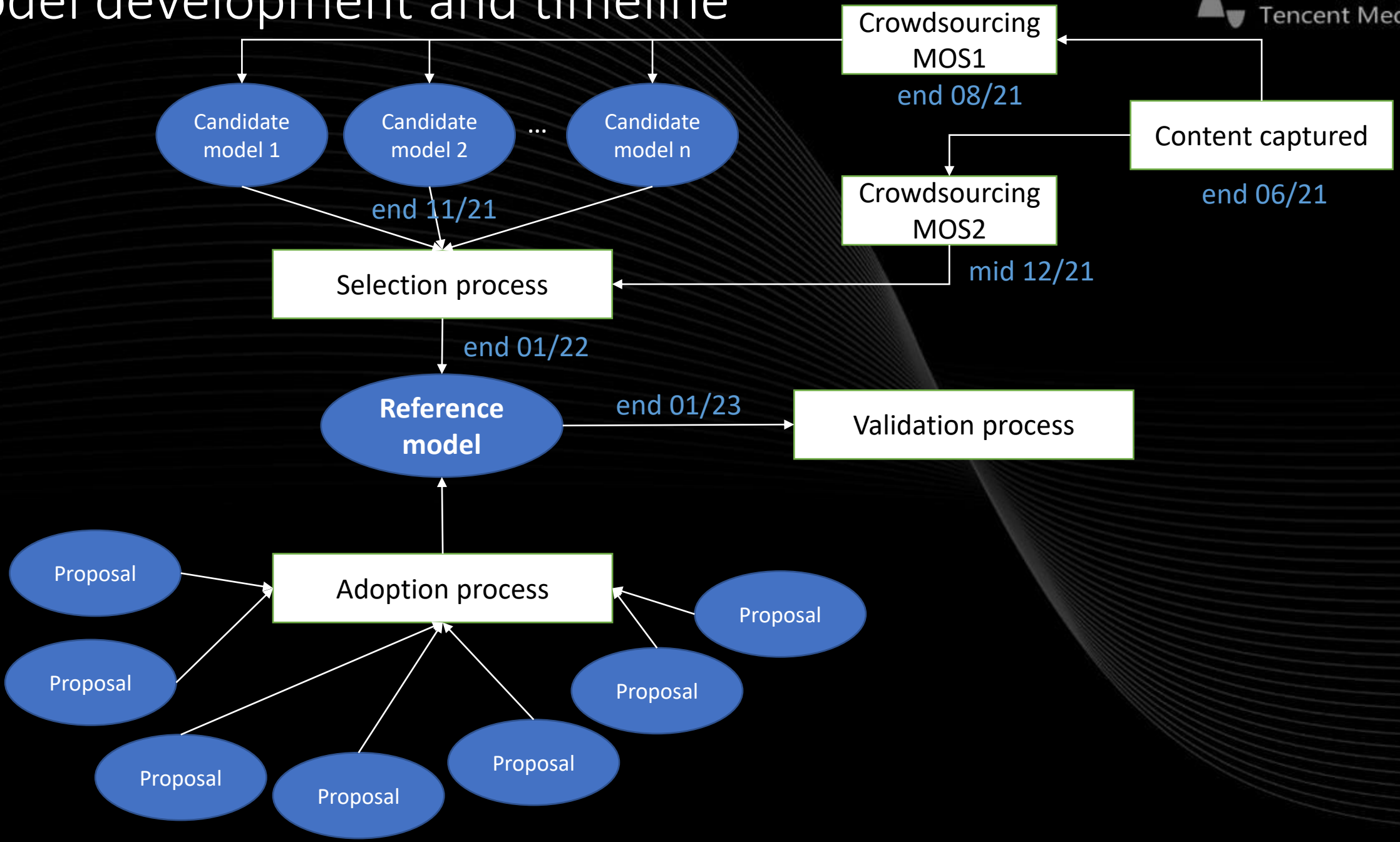

Timeline

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Date	Task
End of June 21	Finalize crowd-sourcing document
End of June 21	Content captured (database 1 + 2) and shared among participants
End of July 21	Database processed (encoding, planning crowd-sourcing sessions, …)
End of July 21	Crowdsourcing platform available
End of August 21	MOS available for database 1
End of Nov 21	Submission of candidate models
Mid of Dec 21	MOS available for database 2
End of Jan 22	Selection of reference model - start of collaborative approach
End of Jan 23	Final model available - Model verification
	Validation database available -> final performance
End of 23	End of the project

Crowd-sourcing approach

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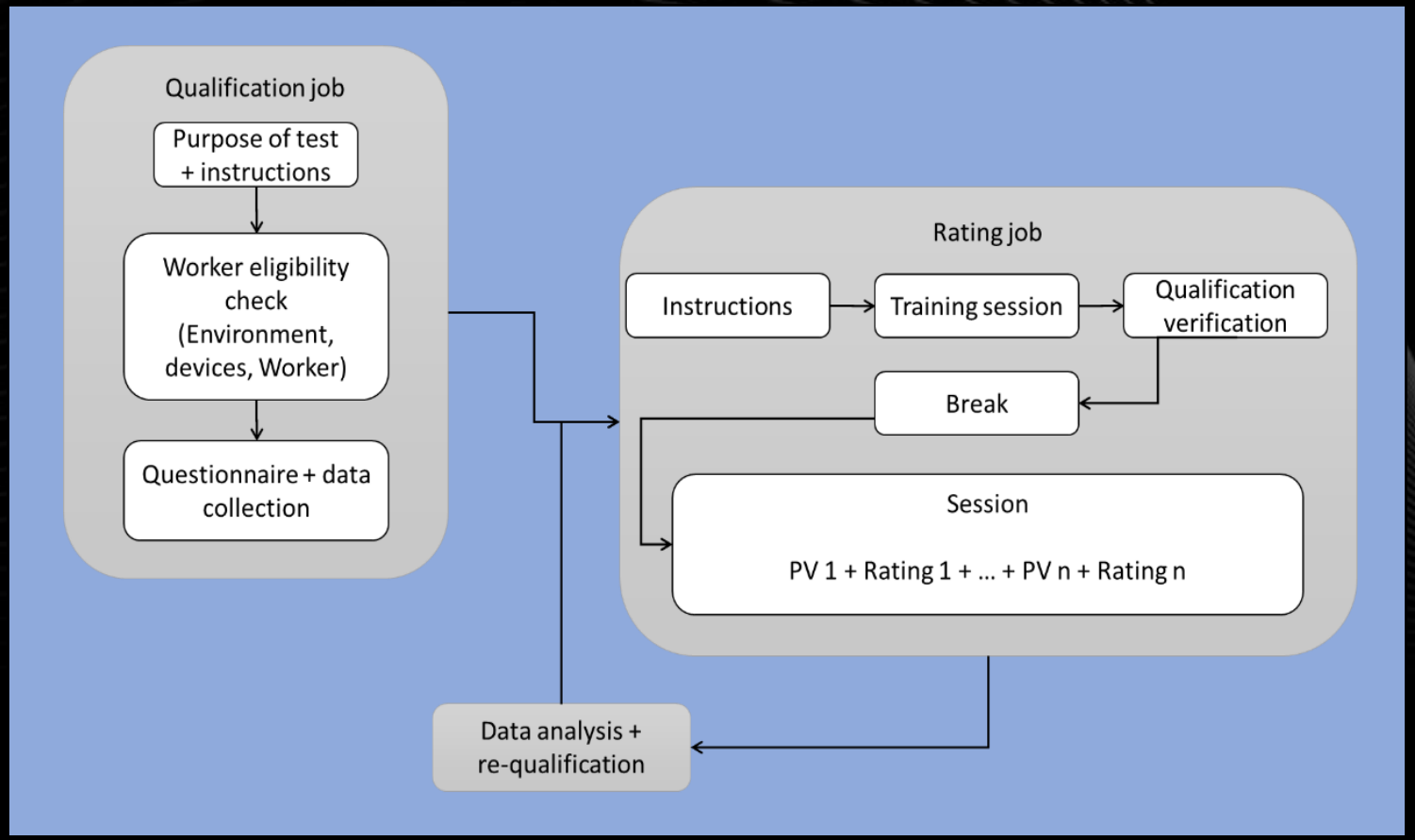
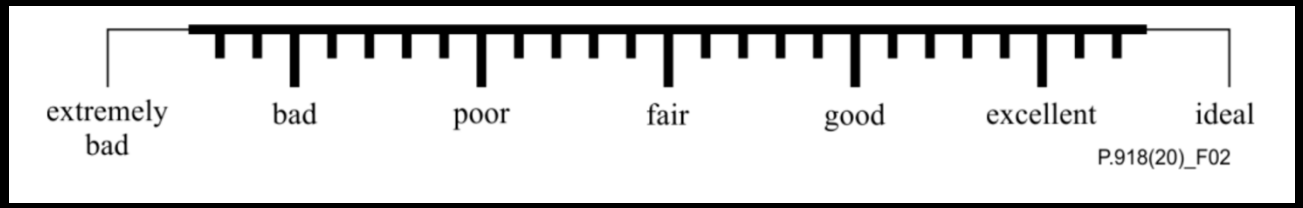


Inspired by

P.808
P.809
P.CROWDV
P.CROWDG

Adapted to P.BBQCG context



Using an Absolute Category Rating (ACR) method P.910 with an extended 7-point continuous scale

Topics under discussion

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- Operating modes
- Details of the collaborative approach
- Details of the crowd-sourcing
- Selection of the evaluation criteria

  RMSE, PLC

  Complexity

  Thinking about:

  - Considering gaming content characteristics: sudden drops of quality (rotations, explosions)

  - Adding a indicator in addition to classical RMSE and PLC, assessing only the ability of the model to reflect sudden quality drops/increases

To know more and get involved

Tencent Media Lab

- Contact Joel Jung (Tencent) and Saman Zadtootaghaj (Dolby)
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  saman.zadtootaghaj@dolby.com

- Reference documents:
  Draft Terms of Reference: SG12-C0530
  Passive tests: SG12-C0529
  Interactive tests: SG12-C0542

- P.BBQCG meetings every 3 weeks, Thursday, 2pm UTC
- Next meeting: June 16th