The Next Level of Convergence and Benchmarking Video Experience

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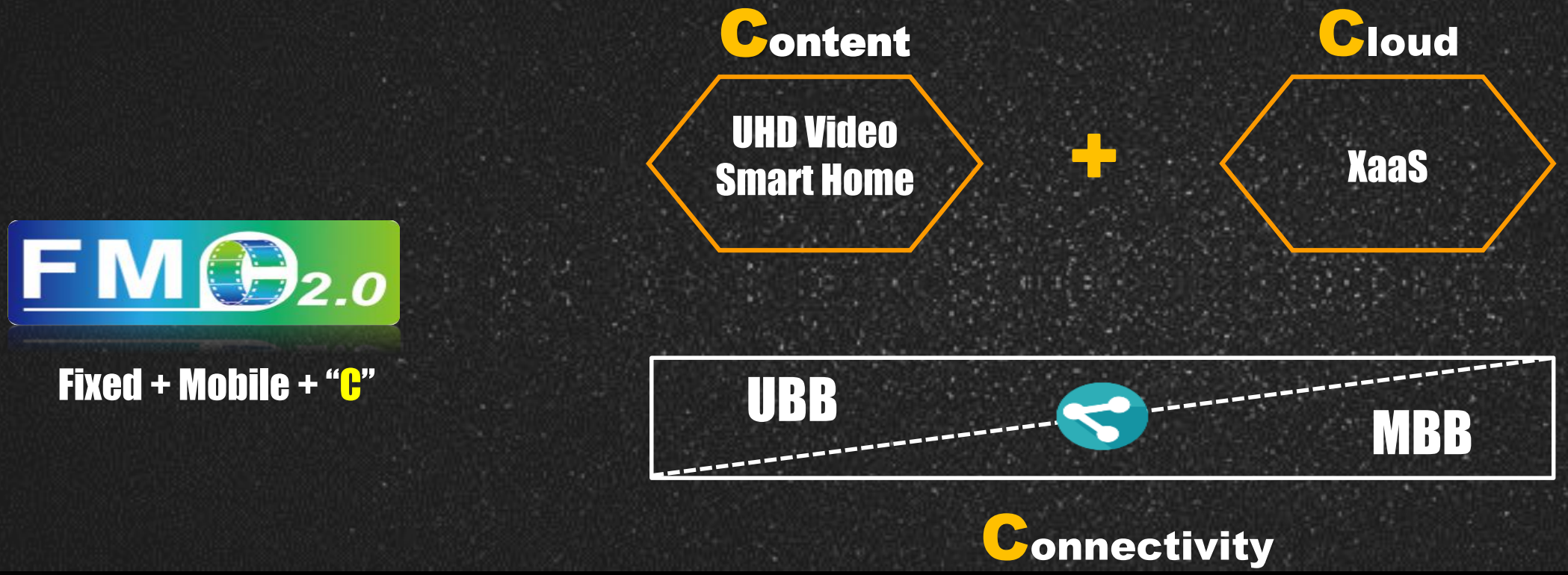
BSG Competition Forum, Nov 25, London

HUAWEI

The next level of Convergence…



User Experience is The Primary Productivity

The Measurable Experience is a ‘MUST’

Video

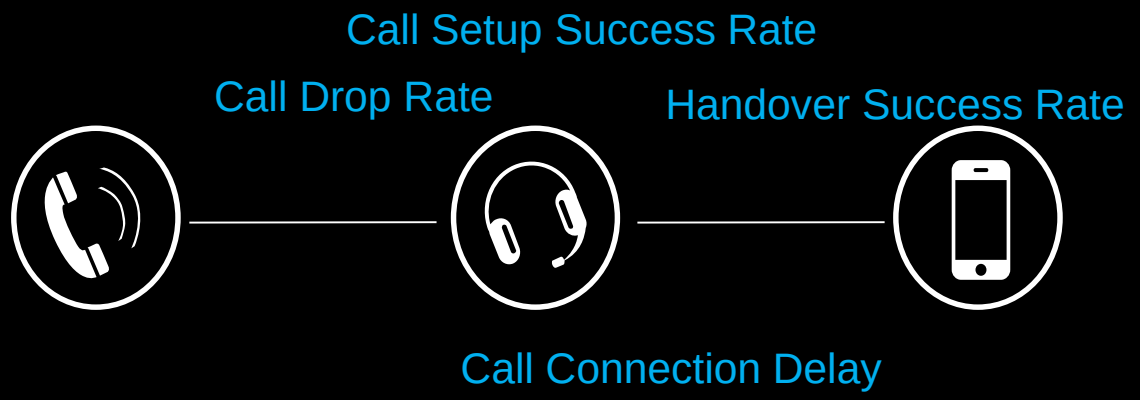
Web

Voice

Voice Experience:

Quantified with Only

Few Parameters



Video

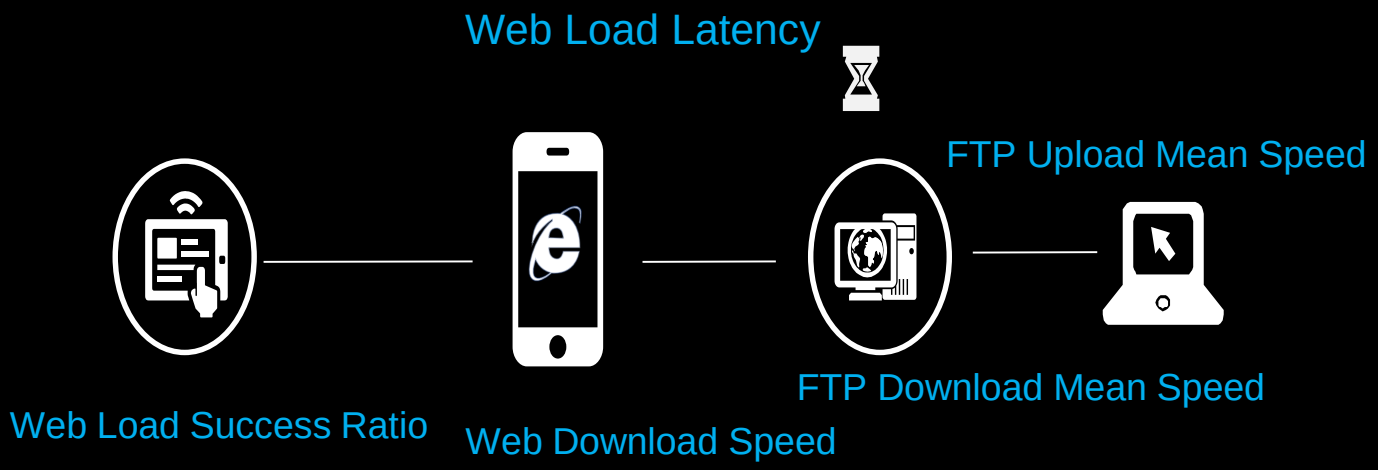
WEB

Voice

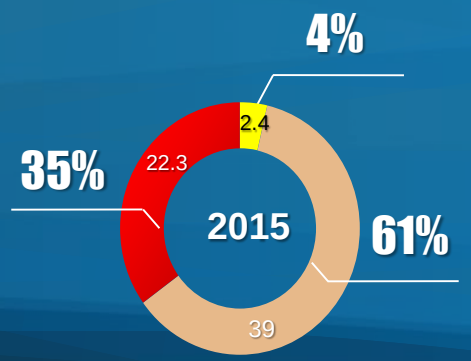
Web Experience:

Quantified with Some

Major Parameters



40 EB@2015 → 275 EB@2020



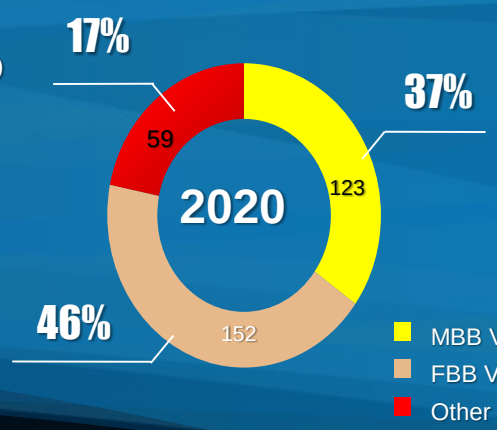
Unit: EB, 1 EB=1,000,000 TB

CAGR MBB VIDEO

120%

CAGR FBB VIDEO

32%



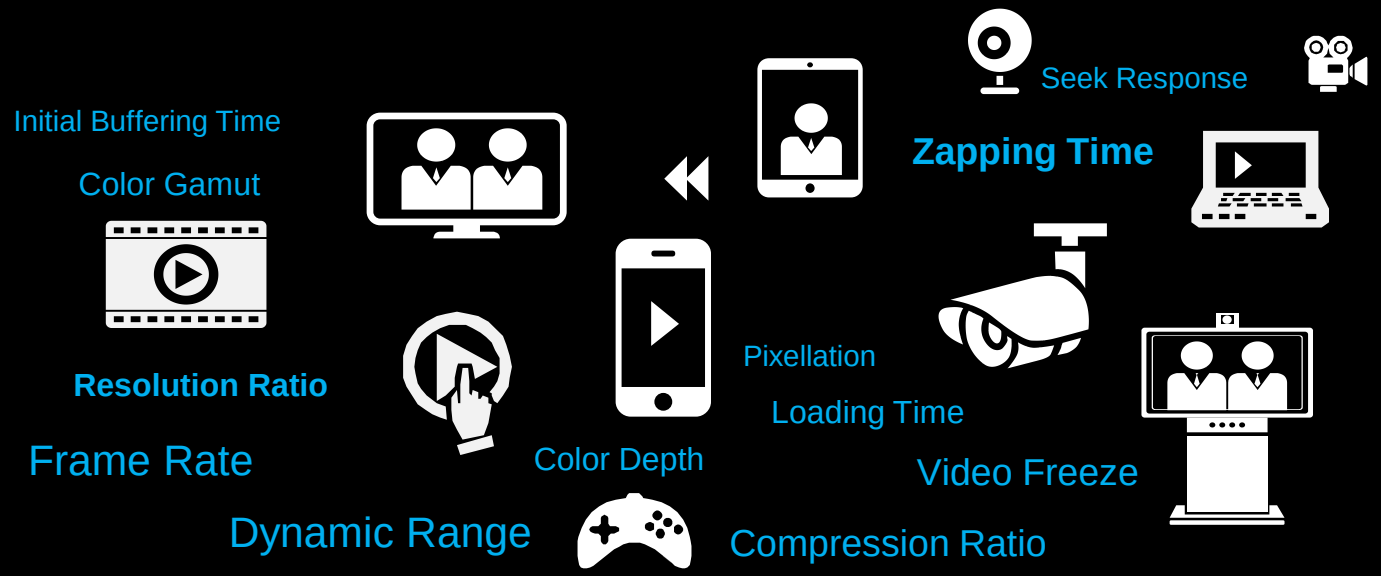
Technology Evolves, Scenario Varies, Content Enriched

Video

Web Video

Video Experience:

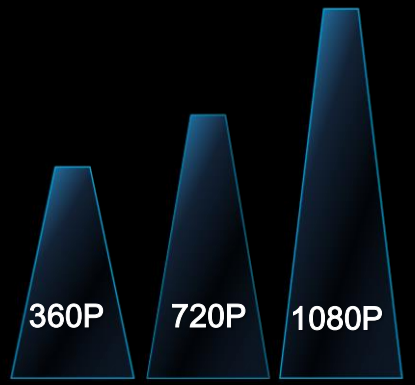
Affected by Much More Factors!



Redefine vMOS

vMOS@2009

Technology Centric



Same Resolution Comparison

Mainly for O&M

U-vMOS@2015

User Experience Centric

User

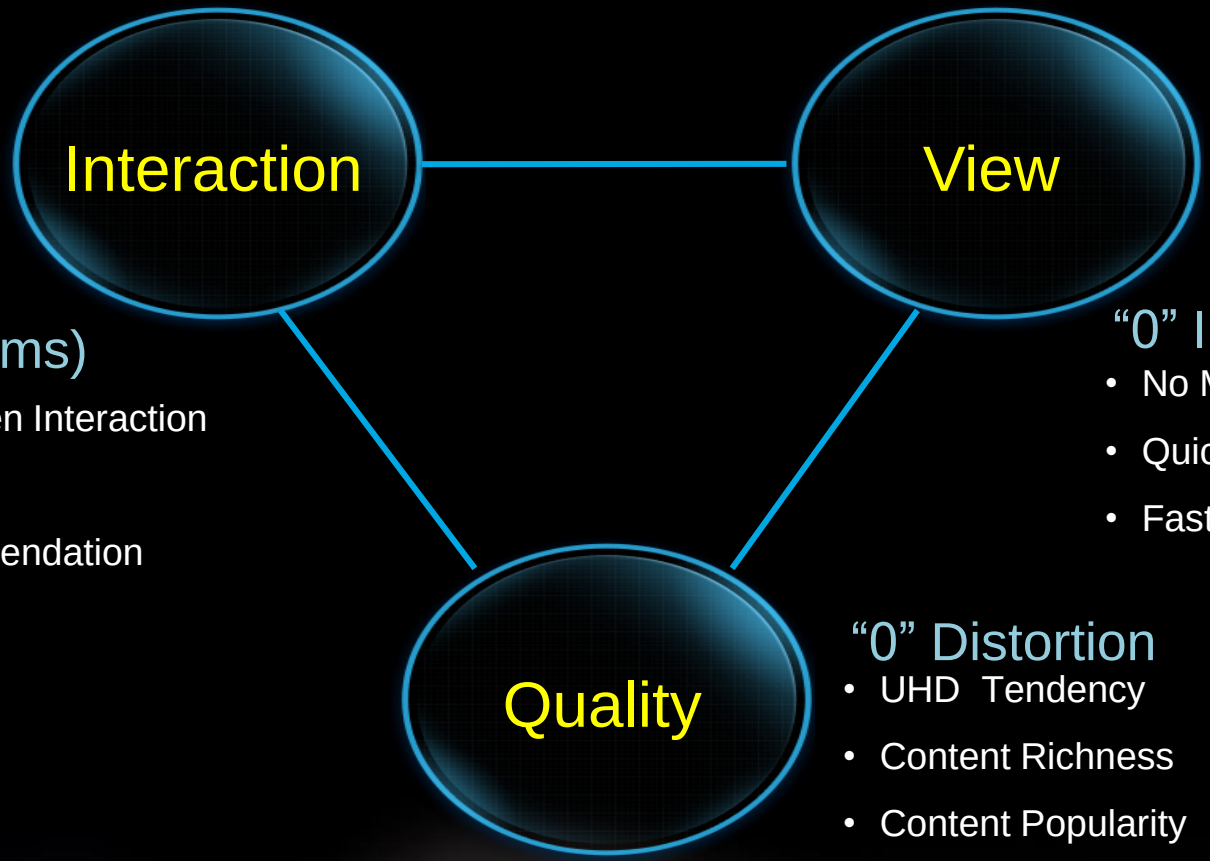
Unified

Ubiquitous

Different Resolution Comparison

Mainly for User Experience

Benchmarking the video experience



“0” Wait (<100ms)

- Smooth Multi-screen Interaction
- Social Sharing
- Intelligent Recommendation

“0” Impairment

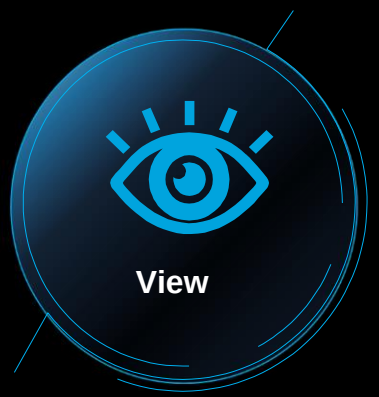
- No Mosaic
- Quick Start
- Fast Channel Zapping

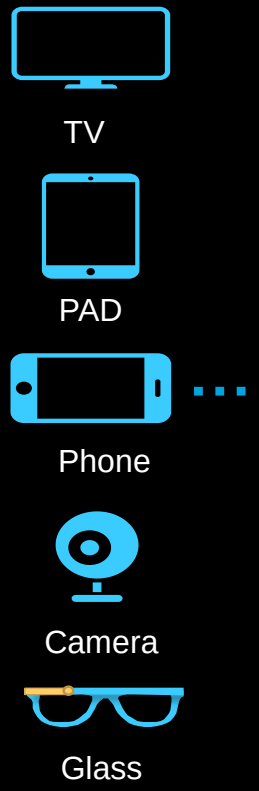
“0” Distortion

- UHD Tendency
- Content Richness
- Content Popularity

Source: Huawei iLAB

Benchmarking the video experience





Resolution Definition	Color Gamut	Frame Rate	Initial Loading Time sLoading	Zapping Time sZapping	Seek Response TimesSeeking	Blocking sBlocking	Stalling sStalling
“0” Distortion			“0” Waiting			“0” Impairment	

TOP3 Objective Factors Reflect Subjective Experience

Consistent user experience cross multi-screens

$$\text{Throughput} \le \min\left(\text{BW}, \frac{\text{CWND}}{\text{RTT}}, \frac{\text{MSS}}{\text{RTT}} \times \frac{1}{\sqrt{p}}\right)$$

User Bandwidth 100M | Delay(RTT) 60ms | PLR(ρ) 10^{-4} = Real Throughput 23M

Bandwidth alone is NOT Enough

U·vMOS

3.0 4.0 .....

fair good

Fragment video service experience

4K video over FBB

Mobile video over 4G

U-vMOS

$$U\text{-}vMOS = (sQuality - 1) \cdot \left(\frac{\alpha \cdot (sInteraction - 1) + \beta\ (sView - 1)}{4 \cdot (\alpha + \beta)} \right) + 1$$

（*α，β vary in different scenarios）

vMOS

Score
Excellent (5)
Good (4)
Fair (3)
Poor (2)
Bad (1)
Excellent (5)

sQuality

Video definition	Maximum Score	
	100’	9.7’
8K	5	5
5K or more	4.72	5
4K	**4.65**	**4.78**
2K	**4.20**	**4.58**
1080p	4	4.45
720p	3.15	4
480p	2.44	3.64
360p	1.66	3

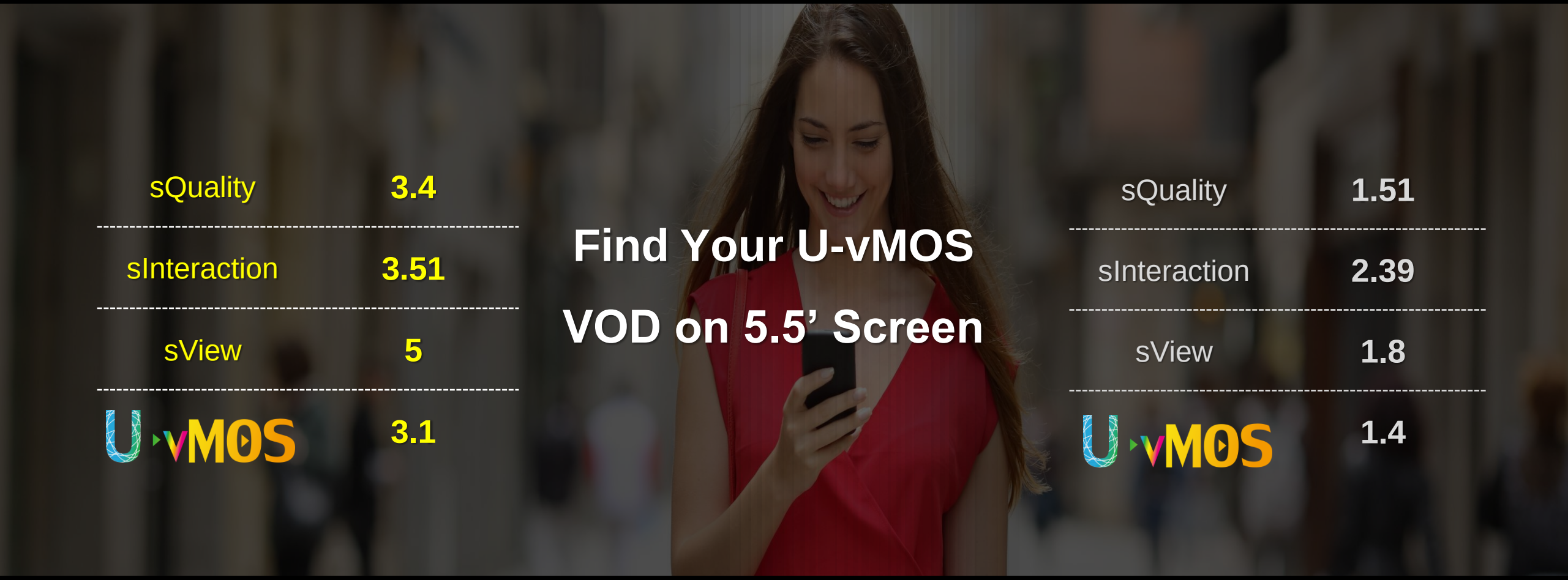
sInteraction

Score	BTV	VoD	
	sZapping Time	sLoading Time @TV	sLoading Time @Phone
5	<=100ms	<=100ms	<=100ms
4	**500ms**	**1s**	**1s**
3	1ms	2s	3s
2	2s	5s	5s
1	>4s	8s	10s

sView

Score	BTV	VoD	
	sBlocking Count	sStalling %@TV	sStalling %@Phone
5	0	0	0%
4	1	0.1%	5%
3	**2**	**1%**	**10%**
2	5	5%	15%
1	>10	10%	30%

sQuality 3.73
sInteraction 3.77
sView 5
U-vMOS 3.34
Find Your U-vMOS
BTV on 42’ Screen
sQuality 2.42
sInteraction 2
sView 4
U-vMOS 1.72


Find Your U-vMOS
VOD on 5.5’ Screen
sQuality 3.4
sInteraction 3.51
sView 5
U-vMOS 3.1
sQuality 1.51
sInteraction 2.39
sView 1.8
U-vMOS 1.4

Cooperation

OPEN

中国电信 CHINA TELECOM

HUNAN UNIVERSITY

XIDIAN UNIVERSITY

LG U+

YouTube

p3 group

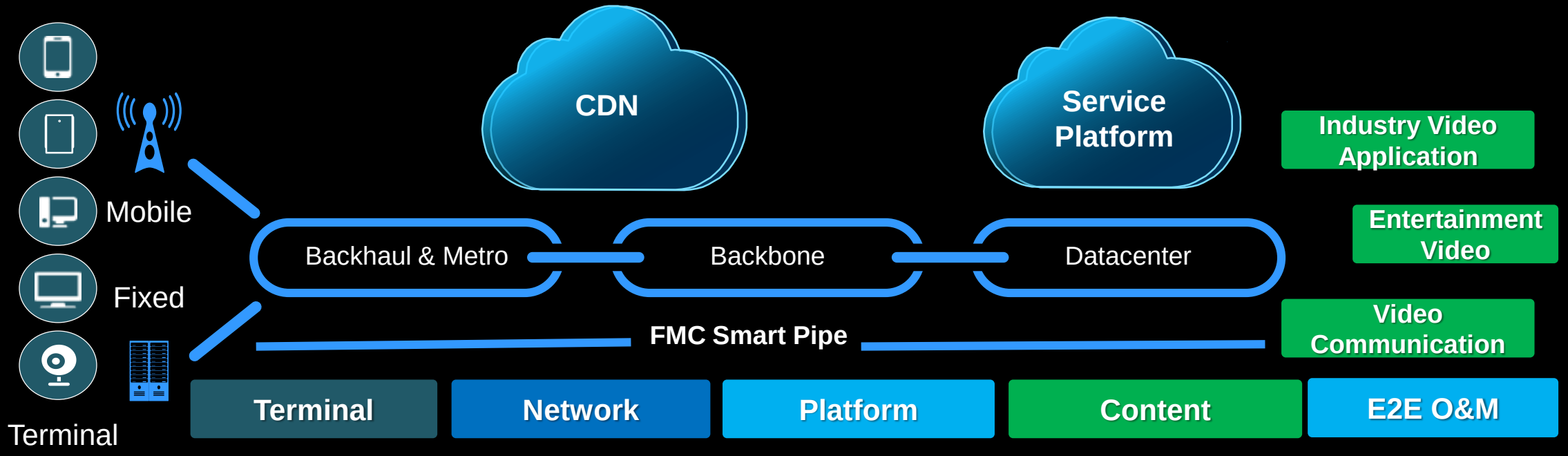
YOUKU

iQIYI 爱奇艺

OOKLA SPEEDTEST

ovum

Coming Soon: User Experience Centric Video Network Architecture



Thank you