ZTE

Network Innovations Empower Metaverse Era

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Workshop NetworldEurope & CCSA - Mar. 1st, 2023

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What is Metaverse?

Every stakeholder talks about “Metaverse” with its own interests. Still there is NO definitive meaning of the term

Next Generation of Internet?
A virtual world that has the sense of reality?
Immersive experience?
Social platform?
Digital economy?

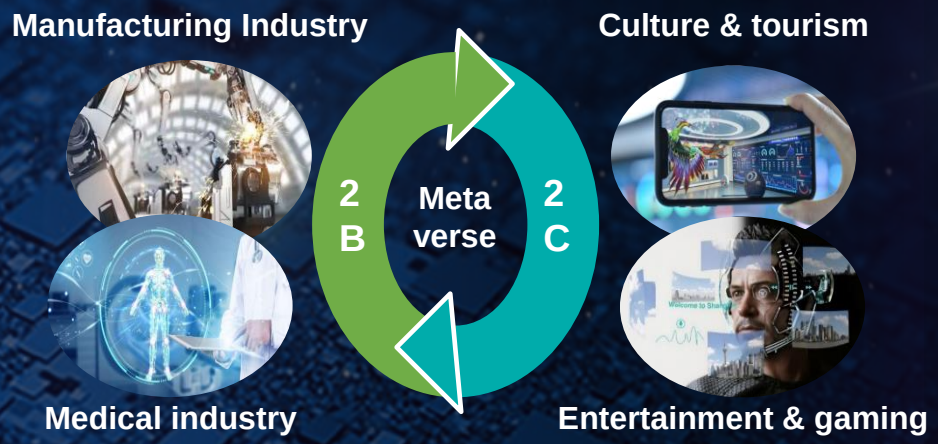
Our views

In particular

Integration of XR-related technologies with Internet

In General

A broader narrative with value added by digital technologies, to forge a virtual world in parallel to the real world.

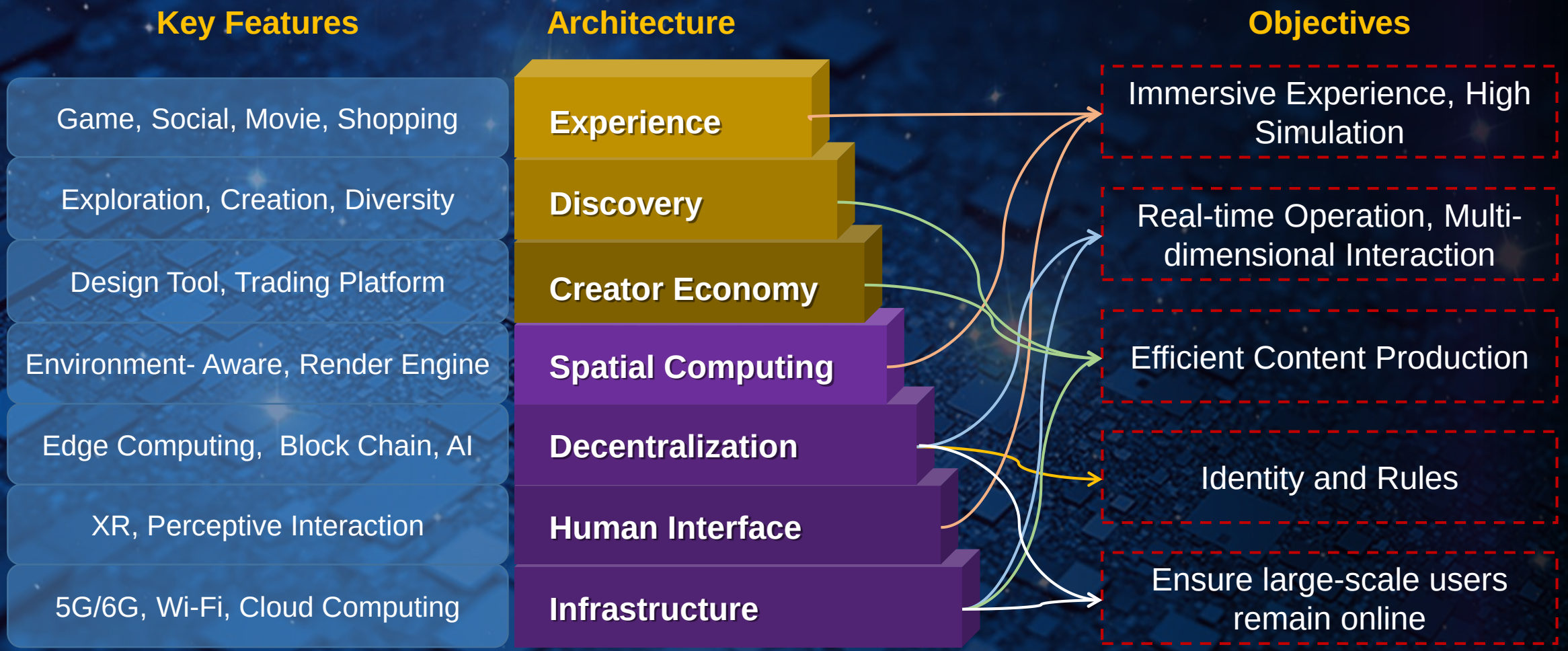


Metaverse is a new digitized world based on digital technologies, which is featured by an integration between reality and virtual world in terms of collaborative creation, value sharing, distributed governance, mutual-trust, etc.

Digital technologies

5G/6G、Computing network、Blockchain、AI、VR/AR、…

Characteristics of Metaverse



Challenges on infrastructure capability

1) Typical scenarios and KPIs under discussion in 3GPP SA1, captured in TR 22.856

Use cases	Characteristic parameter (KPIs)					
	End-to-end latency [ms]	User-experienced data rate	Reliability	Area Traffic capacity	Pos. accuracy	Max Allowable Jitter (ms)
Smart transport	[5-20]	[10-100] Mbit/s	[> 99.9%]	[~39.6] Tbit/s/km^2		
Product design	[≤10]	[1-100] Mbit/s	[> 99.999%]	[3.804] Tbit/s/km^2		
Entertain ment	[5-20]	[1-2000] Mbit/s	[>99.99%]		[<1] m	
Healthcare	[10-100]	[1-100] Mbit/s	[99.9999%]			[< 2] ms for tactile sensors

In addition, energy usage to effectively and efficiently provide mobile metaverse services should be taken into account

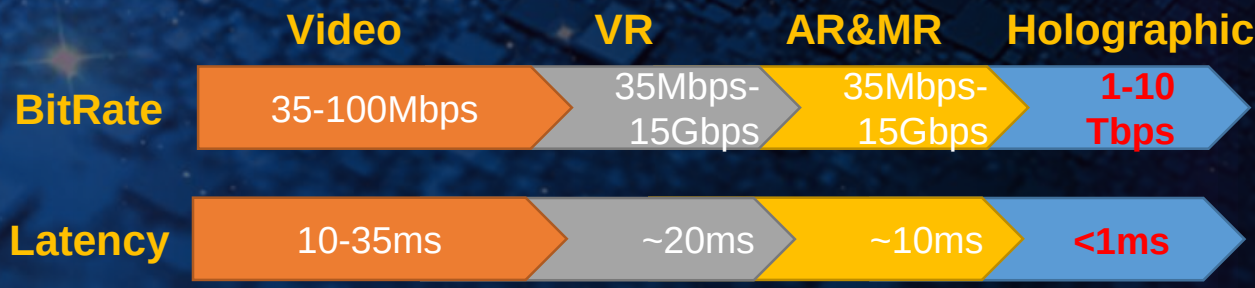
(a) Traffic Flow Simulation & Situational Awareness

(b) Collaborative & Concurrent Engineering

(c) Virtual Humans in Entertainment Metaverse

(d) Surgery Services for Critical HealthCare

2) Extreme Challenges towards Holographic comm. & interactions



Enabling Technologies

Network Infrastructure:

- Enhancement: Connectivity, Throughput, Coverage, Latency, etc.
- Efficiency: Power, Operation & Management, etc.
- Extension: Spectrum, Sensing, Computing, etc.

"Brute-Force Solutions"

- Larger bandwidth & flexible spectrum usage
- Extremely large antenna array
- Ultra-dense & heterogeneous APs
- Hardware/chipset capabilities
  - Computing
  - Storage
  - Power consumption

Enabling Wireless Technologies	Enabling Network Technologies
Evolvable AI	AI Native Network
Advanced Coding & Multiple Access	Security Native Network
Extreme-MIMO (EMIMO)	Digital Twin Network
Reconfigurable Intelligent Surfaces (RIS)	Deterministic Network
Computational Holographic Radio	Information Centralized Network
Joint Comm./Sensing/Computing	Computing and Network Convergence
Tera-Hertz (THz) Communication	Integration of Satellite-terrestrial Network

Observations & Suggestions

- ✓ Although there is no one definitive meaning of Metaverse, some key features and typical use scenarios can be identified
- ✓ Continuous innovations on the next generation network design can shape more powerful infrastructure to support Metaverse use cases
- ✓ Social responsibilities are of great importance for the design of Metaverse
- ✓ To achieve the above goals, some common understanding should be maintained
  - ✓ Global harmonized 6G standard
  - ✓ Collaborations among stakeholders, incl. government, industry, academia
  - ✓ Robust and sustainable supply chain for operators, vendors, consumers
  - ✓ Market regulations based on technical and commercial issues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Simplicity Prevails; Agility Makes Success!
Thank you!