

## Actualizing the Virtual Potentials of the Metaverse 迸發元宇宙無限虛擬潛能

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When the “Metaverse” is mentioned, people often refer to the popular novel and movie “Ready Player One” which describes people using VR headsets to interact within a virtual society. In fact, the word “metaverse” was coined in 1992 by Neal Stephenson in his science fiction novel “Snow Crash” and he explained it as a VR environment where humans used avatars inside a 3D metaphor of the real world.

Today, technology industry movers and shakers seek to actualize the metaverse concept, using cutting-edge hardware and software to make its vision into reality. We are getting close to this goal, with exciting augmented reality (AR) and virtual reality (VR) technologies combining to make an extended reality (XR) that seamlessly combines the physical with the virtual.

Tech giants including Facebook (even renaming itself Meta), Amazon, Microsoft, Google, Tencent, SK Telecom and others, are racing to create their versions of the metaverse end-game. As this vision is built out, there will be enormous potential for commerce, lifestyle and even government in the new universe.

To truly grasp the huge implications, perhaps the best analogy is with how “cyberspace” developed, beginning around the early-1990s with analog telephone modems and text-based terminals. Now, in 2022, it is hard to imagine modern life without a seamless Internet connection spanning multiple end-user devices, across different physical locations from home, to work, to beyond. The metaverse will deliver even more far-reaching implications for humanity. Our imaginations are only just starting to see the potential of this new paradigm as it reshapes our combined analog and digital future.

The growing 5G adoption and numbers of new technologies—such as Blockchain, IoTs, VR and AR applications—are impacting lifestyles in multiple ways, including entertainment, marketing, real-estate, training and remote work, plus other domains. To ensure they are not left behind, enterprises should position themselves to be ready for the metaverse era of global commerce, and start learning about tools that enable seamless, omnichannel, and personalized experiences beyond the 2D Internet.

提到「元宇宙」(Metaverse)，大家往往會聯想到著名同名小說及改編電影《挑戰者 1 號》，它描述了人們如何使用 VR 頭戴式裝置在虛擬世界中進行互動。不過，「元宇宙」一詞其實早於 1992 年便被尼爾·史蒂文森 (Neal Stephenson) 在他的科幻小說《雪崩》(Snow Crash) 中創造出來，他形容「元宇宙」為一個基於現實世界的三維隱喻所打造的虛擬現實環境，而人類會在該環境下使用虛擬化身 (Avatars)。

現今，科技產業的推動及先行者為求化願景為現實，紛紛投入先進硬件和軟件去實現元宇宙。透過整合擴增實境 (AR) 及虛擬實境 (VR) 技術創造出延展實境 (XR)，將現實和虛擬環境無縫結合，正邁向實現元宇宙的目標。

Facebook (現改名為 Meta)、Amazon、Microsoft、Google、Tencent 和 SK Telecom 等的科技巨頭都在競相打造各自的元宇宙「決勝局」。隨著這個新宇宙的建立，商業、生活模式和政府系統都將會迸發無限潛能。

要真正體會到元宇宙將帶來的巨大影響，最好的類比可能是「網絡空間」的誕生。由大約上世紀九十年代初開始，模擬電話解調器 (Modem) 和基於文本的終端系統，便奠定了現今社會科技發展的基礎。到了 2022 年，我們無法想像現今的生活如果沒有互聯網，如何可以跨越不同的地理位置，從家到工作地點，以及更遙遠的地方，無縫連接多個終端用戶設備。元宇宙為人類帶來的影響與日俱增，我們的想像力僅僅可以看到這種新範式的潛力，而實際上它將會重塑這個模擬和數碼結合的未來時代。

5G 應用的增長和日益漸增的新科技，例如區塊鏈 (Blockchain)、物聯網 (IoT)、虛擬實境 (VR) 和擴增實境 (AR) 等，改變了我們多方面的生活，從娛樂消閒、市場營銷、房地產到培訓和遙距工作等領域均帶來不同變化。要與時並進，企業必須做好準備以迎接全球商業的元宇宙時代，並著手學習如何突破 2D 互聯網，實現無縫、全渠道和個性化體驗的新科技。

## Seeking a Physical Foundation to Support a Virtual Future

Surfing between the virtual and the physical, today and in the future, the crucial first place to start preparing for the metaverse world is a robust infrastructure platform. The sophisticated virtual technologies and environments are necessarily supported by real-world hardware and software. Indeed, CITIC Telecom CPC (CPC) has been mindful all along of the growing need for enterprises to eventually adopt metaverse business models, the same way companies embraced the cloud paradigm, using an “innovative infrastructure” approach to ensure metaverse-readiness across the entire business infrastructure, whether it is the network, cloud topology, information security or data center.

With industry-leading innovation capabilities and global resources, CPC offers a highly digitalized and intelligent infrastructure as a metaverse-ready backbone for enterprises, in order to help seize every upcoming opportunity of this monumental digital transformation.

Indeed, CPC has already developed actual business tools and technologies applicable to the metaverse, with additional innovative offerings coming in the years ahead.

For example, CPC has been sharing Blockchain knowledge since 2017 and launched “AR Remote Hand,” its AR-Powered Field Service Management Solution in 2019. With the motto of “Innovation Never Stops”, the company is exploring Phase 2 of its DataHOUSE™ AI-AR Remote Hand solutions, featuring big data analytics, machine learning and algorithm capabilities. This next-generation tool leverages AR, AI and other advanced visualization and collaboration technologies to enable on-site engineers to access and interact with equipment configurations, 3D technical manuals, off-site teams, and other vital resources, all in AR. It was utilized to help CPC’s customers during the earliest days of the pandemic crisis, when ICT staff mobility and availability were greatly restricted. For Phase 2, the AI, analytics and computer vision capabilities have been greatly enhanced, and applications are growing beyond datacenter maintenance to supply chain management, and other domains.

Blockchain technology will also be crucial to the metaverse, serving as the fundamental mechanism to track and exchange ownership of digital assets, including digital currencies and non-fungible tokens (NFTs). In this regard, CPC has already developed a universal blockchain solution based on its flagship SmartCLOUD™ cloud computing platform, allowing enterprises to rapidly and easily deploy a node in powerful world-class blockchain solutions within minutes, instead of weeks.

## 以現實基建去建設虛擬未來

要在虛擬和現實，現在和未來之間遊走，強大的基礎設施是備戰元宇宙的首要關鍵，因為複雜的虛擬技術和環境背後必須有現實世界的軟硬件支持。事實上，中信國際電訊 CPC (CPC) 一直關注企業於元宇宙商業模式的增長需求。正如之前引入雲服務模式的熱潮，CPC 採用「創新基建」的做法，確保整體商業基礎設施，如網絡、雲拓撲結構、資訊安全和數據中心等，均能夠做好迎接元宇宙的準備。

憑藉領先行業的創新能力和全球資源，CPC 為企業打造了高度數碼化和智能化基礎建設，以此作為企業擁抱元宇宙的骨幹，幫助企業抓緊每一個全面數碼化轉型的機遇。

不僅如此，CPC 已研發了適用於元宇宙的實際業務工具和技术，並會在未來數年持續提供更多的創新產品及服務。


舉例而言，CPC 自 2017 年起便開始分享區塊鏈技術，並於 2019 年推出了我們以 AR 技術支援的遠程運維服務——“AR 千里眼”。秉持「創新不斷」的服務理念，CPC 已展開了第二階段“DataHOUSE™ AI-AR 千里眼”服務的研究，並融入了大數據分析、機器學習和算法能力等先進技術。這項創新服務利用了擴增實境 (AR)、人工智能 (AI) 及其他先進的可視化和協作技術，使現場工程師能夠透過擴增實境 (AR) 中查看設備配置、3D 操作手冊，與遠程團隊互動及交流關鍵資訊。全球疫情爆發初期，ICT 人員的流動性和可用性受到極大限制，AR 千里眼遠程運維服務便大大幫助了 CPC 的客戶解決問題。在第二階段，更大幅提升了人工智能 (AI)、分析及電腦視覺能力，應用範圍也從數據中心維護擴展到供應鏈管理及其他領域。

區塊鏈技術對元宇宙至關重要，是有效追蹤和交換數碼資產擁有權的重要機制，更包括應用在數碼貨幣及非同質化代幣 (NFT) 等方面。有見及此，CPC 已基於自身旗艦 SmartCLOUD™ 雲運算平台，開發了一個通用的區塊鏈解決方案，使企業在數分鐘內便能迅速並輕鬆地部署強大的世界級區塊鏈方案中的區塊鏈節點，不必再耗費數周的時間。

元宇宙需要一個多功能、強大穩健、極低延遲和高度可靠的網絡。CPC 除了提供電訊級 MPLS 網絡解決方案外，還推出了以人工智能強化的 TrueCONNECT™ Hybrid SD-WAN 解決方案，為元宇宙提供最優化的網絡連接和安全。TrueCONNECT™ Hybrid 不但可以優化企業網絡和應用的性能，更可智能地提高營運效率及網絡使用率。其人工智能增強功能使方案能以前所未有的速度和準確性主動識別和預測異常情況，通過長短期記憶 (LSTM)、關係矩陣運算、識辨網絡和業務應用的關係及結構等技術，以及其他深度學習和人工智能創新，方案解決了傳統 SD-WAN 的常見問題。

The metaverse will require a highly versatile, powerful network, with extremely low latency and supreme reliability. In addition to its carrier-class MPLS networking solutions, CPC offers its AI-enhanced TrueCONNECT™ Hybrid SD-WAN solution, as an ideal solution to maximize metaverse connectivity performance and security. TrueCONNECT™ Hybrid optimizes the performance of enterprise networks and applications, while intelligently improving operating efficiency and network utilization. Its AI enhancements proactively recognize and predict abnormalities with unprecedented speed and accuracy, solving the visibility problem of traditional SD-WANs via techniques such as Long Short-Term Memory (LSTM), matrix relational operations, identification of relationships and structures between the network and business applications, and other Deep Learning and AI innovations.

Regarding abnormalities, because of its virtual expansiveness and content richness, the metaverse will greatly increase the “attack surface” vulnerable to bad actors. To mitigate this increased threat, CPC developed its AI Visual Security technology which transforms malware into graphical models, then uses neural networks to extract features and build detection models with Deep Learning. This breakthrough approach leapfrogs the traditional security approach of detecting malware by comparing “signatures” which has been made obsolete by advanced malware that is constantly modified and obfuscated. In other words, CPC’s innovative new approach is analogous to “facial recognition” for malware, and by utilizing computer vision inference on the edge, malware can be quickly identified and classified, and remedial measures taken to neutralize the threat before it impacts the metaverse.

“The best way to predict the future is to invent it,” famously said computer pioneer Alan Kay. CPC has done exactly that throughout its corporate history, anticipating technology and business trends, then developing innovative solutions to address current and future needs of its enterprise customers. CPC’s innovations often come from insights gained through its own daily internal workflows, strong capabilities of its infrastructure and innovation team, discussions with its own staff, and with customers. The immense potential of the metaverse is no exception, and CPC has leveraged cutting-edge technologies to create solutions applicable to the most pressing business needs today, while empowering organizations with an eye to the future, equipping them to be ready for a coming “big bang” of potential from the metaverse. 

在異常情況方面，由於元宇宙擁有廣闊的虛擬環境和豐富的內容，其「攻擊面」亦隨之大大增加。為了減低新增威脅，CPC 開發了人工智能視覺運算安全技術，將惡意軟件轉化為圖形模型，然後利用神經網絡提取特徵，並通過深度學習建立檢測模型。鑒於現今的惡意軟件持續進化並混淆視聽，這種突破性的技術超越了以比較「識別碼」(Signatures) 來偵測惡意軟件的傳統方法。簡單而言，CPC 的創新方法就如惡意軟件的「面部識別系統」，利用邊緣電腦視覺推理，技術能夠快速識別及分類惡意軟件，並採取即時補救措施，在威脅影響到元宇宙之前便將其消滅。

「預測未來的最好方法是創造未來」是電腦科學先驅艾倫·凱的名言。CPC 一直秉持著大膽創新的理念，勇於預測技術和商業趨勢，再開發創新的解決方案，以滿足企業客戶當前甚至未來的需求。CPC 的創新產品往往來自於日常的內部業務流程、自身強大的基礎建設和創新團隊的能力，甚或從員工和客戶之間的討論中獲得的見解。元宇宙的無限潛能自然亦觸發了 CPC 運用各種尖端科技，創造方案以滿足當前最為緊迫的業務需求，同時賦予企業著眼於未來的能力，為即將到來的元宇宙「大爆炸」整裝待發。 