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講者簡介 Speaker Profile

金海是華中科技大學計算機科學與技術學院長江學者特聘教授(計算機科學與工程)。1994 年獲得華中科技大學計算機系統結構博士學位。1996 年獲得德國學術交流獎學金，出訪德國開姆尼茨工業大學。1998 至 2000 年就職香港大學，1999 至 2000 年擔任南加州大學訪問學者。他於 2001 年獲得中國國家自然科學基金委員會傑出青年獎。金海是中國最大的網格計算項目——教育科研網格的首席科學家，也是國家 973 計劃“計算系統虛擬化基礎理論與方法研究”及“雲計算安全的基礎理論與方法研究”的首席科學家。

金海是國際電機電子工程師學會（IEEE）會員，中國計算機協會會士以及國際計算機協會會員。他參與編寫了 22 本著作，發表了 700 多篇學術論文。他的研究領域包括計算機體系結構、計算系統虛擬化、集群計算和雲計算、對等計算、網絡存儲及網絡安全。

Hai Jin is a Cheung Kung Scholars Chair Professor of Computer Science and Engineering at Huazhong University of Science and Technology. Jin received his Ph.D. in computer engineering from Huazhong University of Science and Technology in 1994. In 1996, he was awarded a German Academic Exchange Service fellowship to visit the Technical University of Chemnitz in Germany. Jin worked at The University of Hong Kong between 1998 and 2000, and as a visiting scholar at the University of Southern California between 1999 and 2000. He was awarded Excellent Youth Award from the National Science Foundation of China in 2001. Jin is the chief scientist of ChinaGrid, the largest grid computing project in China, and the chief scientists of National 973 Basic Research Program Project of Virtualization Technology of Computing System, and Cloud Security.

Jin is a IEEE Fellow, CCF Fellow, and a member of the ACM. He has co-authored 22 books and published over 700 research papers. His research interests include computer architecture, virtualization technology, cluster computing and cloud computing, peer-to-peer computing, network storage, and network security.

講題摘要 Topic Outline

Runtimes for Cloud Computing: Challenge, Solution and Trends

雲計算模型在過去十年帶來了計算機科學領域的變革，使計算成為第五大公用事業。這一模型引起了學術界、業界和政府部門的廣泛關注。通過提供隨時隨地獲取、隨用隨付費的訂購服務，雲計算已成為現代經濟的支柱。容器技術、無服務器計算、邊緣計算、霧計算和人工智能等最新科技發展及模型為雲計算創造了新的機會，但也帶來了新的挑戰，因此需要新的方法和研究策略。

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本次專家組主題講座聚焦當前雲計算環境下新興技術面臨的挑戰及未來的研究趨勢。以容器技術為代表的輕量級虛擬化技術以快速、輕量和便捷的特性革新了傳統的應用程序配置模型，但因其隔離性及安全性的問題無法完全取代虛擬機。無服務器架構的出現免除了大量運行和維護工作，極大節省了企業雲應用開發成本。但是，事件觸發運行機制和細粒度應用程序分解導致冷啟動速度加快，實例隔離性更高，低延遲通信也變得更加重要。邊緣計算是雲計算未來發展的重要趨勢，如何在資源受限的邊緣環境中確保服務質量是一大挑戰。人工智能是近年來計算機領域最熱門的研究方向，如何使人工智能程序更好地在雲端運行，如何通過人工智能優化雲計算技術都是引人注目且前景廣闊的研究領域。

The Cloud computing paradigm has revolutionized the computer science horizon during the past decade and has enabled the emergence of computing as the fifth utility. It has captured significant attention of academia, industries, and government bodies. Now, it has emerged as the backbone of modern economy by offering subscription-based services anytime, anywhere following a pay-as-you-go model. The recent technological developments and paradigms such as, container technology, serverless computing, edge/fog computing, and AI are creating new opportunities for Cloud computing. However, they are also posing several new challenges and creating the need for new approaches and research strategies.

This panel position talk focuses on the challenges faced by emerging technologies in the current cloud environment and future research trends. The lightweight virtualization technology represented by Containers revolutionizes the traditional application deployment model with fast, lightweight and convenient features, through isolation and security issues make it impossible to totally replace Virtual Machines. The emergence of Serverless architecture has greatly liberated operation and maintenance work, and saved the considerable cost for the development of enterprise cloud applications. However, the event-triggered run mode and fine-grained application decomposition lead to faster cold start speed and higher of instance's Isolation, and low-latency communication becomes more important. Edge computing is an important trend in the future development of cloud computing. How to guarantee QoS in a resource-constrained edge environment is a major challenge. AI is the hottest research direction in the computer field in recent years. How to make AI programs run better on the cloud, and how to optimize cloud computing technology through AI are both attractive and promising research field.