

交大打造全球首套 5G 開源核心網路軟體

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本校由陳志成教授所帶領的團隊研發出全球第一套符合國際標準的 5G 開源核心網路軟體——「free5GC」。並於 5 月 27 日由科技部召開記者會，不僅有機會未來應用在智慧工廠、智慧醫院、智慧車站、機場、港口等各方面，更有望打破目前 5G 由國際大廠壟斷及要價昂貴的狀況。

陳志成教授指出，5G 系統分為兩個層面，一是基地台，二為核心網路，其帶領的團隊便是著重於開發軟體層面的原始碼。他解釋「所有的基地台後面有一套很複雜很大的網路，那個就叫核心網路。若核心網路沒有布建起來，將導致所有的服務都不能使用。」

目前一般民眾使用的 5G 系統，核心技術多掌握在 Nokia、Ericsson、華為三大廠，屬於公網，不但價格昂貴，且不利客製化及在地化。而 free5GC 能為客戶量身打造「5G 專網」，提供一個非常好的 5G 核心網路方案。陳志成教授形容，這套開源軟體的概念，就像電腦的「微軟」或手機的「Android」，核心網路硬體設備平台只要載入 free5GC，便能進入 5G 的產業技術。

團隊從 2014 年開始研發，耗時六年，成功開發出符合國際標準的「free5GC」核心網路原始碼後，將其公佈於網路上，讓所有使用者免費讀取。陳志成說：「我們開放原始程式碼，看上的是整體產業的發展，這是全世界首創的 5G 開源核心網路軟體。」

儘管開源軟體免費提供各界使用，但團隊也已成立「通訊服務與軟體研究中心」，藉由制度的管理，與產業合作方式採會員制，提供 free5GC 的技術諮詢等服務，目前已與中華電信、啟碁與思銳科技簽約。中華電信研究院所長楊文豪表示，「很高興台灣能有這樣的技術，並期待能與中華電信自主研發的核心技術結合，發展出相關的解決方案。」

free5GC 推出後受到各界的高度關注，許多海內外學者爭相前來交大交流觀摩，並提出多項學術合作邀請。其中便以和美國萊斯大學（Rice University）進行大規模天線網路的協同實作最引人注目。此外，free5GC 更是榮獲頒科技部「未來科技突破獎」，成為台灣 11 項領先全球的技術之一。



NCTU: The First—open Source 5G Core Network Launches

Free5GC, the first open-source 5G core network in accordance with 3GPP release 15, was developed by Dr. Jyh-Cheng Chen and his team at National Chiao Tung University (NCTU). Ministry of Science and Technology (MOST) announced the launch of free5GC on 27 May 2020. Free5GC not only brings innovative 5G services in specific fields, such as smart factories, smart hospitals, smart transportation stations, airports, and seaports, but also offers a cost-effective alternative to fight against the monopoly of international telecom equipment vendors.

“5G network architecture comprises radio access networks and core network. My team focuses on implementing the critical functions of the core network,” Dr. Chen said. “A core network is a telecommunication network's key component, which provides various services to customers who are connected by the access network. This is to say, no core network, no services.”

The core network deployment of public 5G networks, currently dominated by Nokia, Ericsson, and Huawei, are expensive and unfavorable for customization and localization. On the other hand, free5GC is a very attractive solution for private 5G networks. According to Dr. Chen, the sharing idea of this open-source software suite is like “Microsoft operation system” to computers or “android” to mobile phones. Once deploying free5GC on the commodity hardware, you can effectively leverage the 5G technology.

Dr. Chen's team is dedicated to mobile core network research since 2014. During the last six years, the free5GC source code has been built successfully and

released as free and open-source software under an open-source license. “We have released our source code into the public domain in order to accelerate the growth of industrial development,” Dr. Chen said, “It is the world's first 5G open-source core network software.”

Based on the spirit of open source, Dr. Chen's team established a “Communication Service/Software Laboratory” to provide professional consultations and other services in 5G core networks to the industry within customers' membership plans. Meanwhile, the team has also expanded partnership with Chunghwa Telecom, Wistron NeWeb Corp., and EstiNet Technologies Inc. “We are truly excited by the advancement in 5G development in Taiwan,” Dr. Wen-Hao Yang, Director of Chunghwa Telecom Laboratories, said, “and looking forward to integrating it with the in-house core technology of Chunghwa Telecom to provide solutions for diverse application scenarios.”

Since the advent of free5GC, Dr. Chen's team has received great attention from all over the world. Rice University in the U.S., for example, is developing massive MIMO base stations. Using free5GC as the core network, the research team at Rice University is actively collaborating with Dr. Chen's team. Through the collaboration between Dr. Chen's team and Rice University, free5GC has been promoted internationally. Moreover, Dr. Chen's team also received the Award of Futuristic Breakthrough Technology from the Ministry of Science and Technology in 2019. Free5GC further won “Global Number 1” as one of the eleven leading technologies in the world developed in Taiwan.