

十一、研究計畫中英文摘要：請就本計畫要點作一概述，並依本計畫性質自訂關鍵詞。

(二) 計畫英文摘要。(五百字以內)

Industrial computers are known for their strict requirements on reliability and robustness. They must be highly available even in an extreme working environment. Industrial computers have been widely used as the core components of many applications such as the networking equipments. The ADLINK technology Inc., our industrial partner, ranks fourth in the share of the global industrial computer market (~5.2%). The ADLINK has been able to keep high profit margin since founded. However, the management team of ADLINK has found that, cost and quality are no longer the key factors to achieve high profit margin. Instead, the ability to develop domain-specific, value-added applications for products has become more and more important in market competitiveness in recent years. As projected by the industrial experts from ADLINK, the aTCA blade servers with the high-availability virtualization technology will be one of the key products of the next-generation industrial computers. However, the technology to integrate high-availability industrial computers and virtualization technology is still at its infancy stage. To improve their competitiveness in the coming three to five years, the industry of industrial computers demands the following four key technologies: performance fine-tuning technology for virtualization on the industrial computers, fault-tolerance technology for virtualization on the aTCA blade servers, software-defined-network (SDN) technology over aTCA blade servers, and various domain-specific, value-added applications and services based on aTCA blade servers. Therefore, we plan to provide value-added applications. In the past year, we have widely studied the technology of fault-tolerant virtual machine, and developed a solution of level 1 fault tolerance, namely FT4VT v1.0, for the aTCA blade servers. In order to develop highly skilled personnel, we have delivered two industrial-technology-oriented courses to the NCU students in this year. In the next three years, we plan to develop the advanced FT4VT v2.0 technology of fault tolerance level 2 for aTCA blade servers. We also plan to develop several SDN-related technologies and applications that can add value to the aTCA blade servers. To meet the software quality requirement from the industry, we will introduce software process management techniques, such as automatic testing, to this project. The research team of NCU has accumulated valuable experience from four prior fault-tolerance-related projects and five prior server-virtualization-related projects. In addition, the research team has accumulated eight fault-tolerance-related patents. We believe that, with our experience and ability, we can develop the next-generation fault-tolerance technology for server virtualization on industrial computers, and help our industrial partners add values to their products in the near future.

Keywords: Industrial PC; Software Fault Tolerance; Virtualization Technology; Software Defined Network