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授与した学位	博 士		
専攻分野の名称	工 学		
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学位授与の要件	自然科学研究科	産業創成工学専攻 (学位規則第 4 条第 1 項該当)	
学位論文の題目	A design and implementation of user-PC computing system platform using Docker (Docker を用いたユーザ PC コンピューティングシステムのプラットフォームの設計と実装)		
論文審査委員	教授 船 曳 信 生	教授 田 野 哲	教授 野 上 保 之
学位論文内容の要旨			
<p>This thesis studies implementation of <i>user-PC Computing System (UPC)</i> system platform using <i>Docker</i> for a low-cost and high performance distributed computing based on the master-worker model. The UPC system offers computation capabilities for the members in an organization by using the idling computing resources of their PCs.</p> <p>In this thesis, I study <i>user-PC Computing System (UPC)</i>, which allows various application programs to run on various PC environments for the <i>UPC workers</i> using the <i>Docker container technology</i>. Firstly, I present the design and implementation of the UPC system platform using <i>Docker</i>. By adopting <i>Docker</i>, the UPC system can accept various jobs or applications to run on user-PCs as the workers with different platforms and environments. Secondly, I present the implementation of the <i>web interface</i> in the UPC system for job submissions by the users. Thirdly, I present the implementation of the two <i>online job acceptance functions</i> for accepting the jobs from the application systems to enhance their processing capabilities. Fourthly, I present the implementation of the <i>job migration function</i>, using the two open source software, CRIU and Podman. Lastly, by extending the <i>dynamic job migration function</i>, I present the implementation of the <i>job running backup function</i> in the UPC system. It periodically check-points the running job in a worker, and automatically migrates it to another healthy worker when the current worker meets a trouble.</p> <p>This thesis is organized as follows: Chapter 1 introduces the background, motivation and the contributions of the study in this thesis. Chapter 2 presents the design and implementation of the UPC system platform using <i>Docker</i>. Chapter 3 presents the implementation of the web interface for job submissions. Chapter 4 presents the implementations of the online job acceptance functions and the evaluations. Chapter 5 presents the implementation of the job migration function and the evaluations. Chapter 6 presents the implementation of the running job backup function and the evaluations. Chapter 7 reviews relevant works in literature. Finally, Chapter 8 concludes this thesis with some future works.</p>			

論文審査結果の要旨

This thesis presented the design and implementation of user-PC Computing System (UPC) system platform using Docker for a low-cost and high performance distributed computing based on the master-worker model. The UPC system offers computation capabilities for the members in an organization by using the idling computing resources of their PCs.

In this thesis, he studied the user-PC Computing System (UPC), which allows various application programs to run on various PC environments for the UPC workers using the Docker container technology. Firstly, he presented the design and implementation of the UPC system platform using Docker. By adopting Docker, the UPC system can accept various jobs or applications to run on user-PCs as the workers with different platforms and environments. Secondly, he presented the implementation of the web interface in the UPC system for job submissions by the users. Thirdly, he presented the implementation of the two online job acceptance functions for accepting the jobs from the application systems to enhance their processing capabilities. Fourthly, he presented the implementation of the job migration function, using the two open source software, CRIU and Podman. Lastly, by extending the dynamic job migration function, he presented the implementation of the job running backup function in the UPC system. It periodically check-points the running job in a worker, and automatically migrates it to another healthy worker when the current worker meets a trouble.

The applicant has published one journal paper, three international conference papers, and one domestic conference paper to present the contributions.

From the overall evaluation of this thesis, the applicant has satisfied the qualification condition for the doctor degree in Engineering from the Graduate School of Natural Science and Technology at Okayama University.