

# **Design and Implementation Container Terminal Management System**

## **Case Study: Port Sudan Sea Port Corporation**

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**Thesis Submitted in Partial Fulfillment of the Requirement for the Degree of  
Master in Computer Sciences**

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**Faculty of Post Graduate Studies**

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## ***Dedication***

*This study is wholeheartedly dedicated to our beloved parents, who have been our source of inspiration and gave us strength when we thought of giving up, who continually provide their moral, spiritual, emotional, and financial support.*

### ***Acknowledgements***

First and foremost, praises and thanks to the God, the Almighty, for His showers of blessings throughout my research work to complete the research successfully.

I would like to express my deep and sincere gratitude to my research supervisor ,Dr. adam hassai ,M.Sc in Computer Sciences ,PhD in Computer Sciences, for giving me the opportunity to do research and providing invaluable guidance throughout this research. His dynamism, vision, sincerity and motivation have deeply inspired me. He has taught me the methodology to carry out the research and to present the research works as clearly as possible. . It was a great privilege and honor to work and study under his guidance.I owe so much to my whole family for their undying support, their unwavering belief that I can achieve so much. Unfortunately, I cannot thank everyone by name because it would take a lifetime but, I just want you all to know that you count so much. were it not for your sincere love and help, I would never have completed this thesis. So thank you all .

## Declaration

I hereby declare that this thesis is based on my own original work except for quotations and citations, which have been duly acknowledged. I also declare that it has not been concurrently submitted for any other degree at Red Sea University or any other institutions.

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Date:

## Approval

Examination Committee has met on 4th April 2021 to conduct the final examination of Khadeeja Hussein Ali, on his/her Master of Science thesis entitled “ Container Terminal Management ” in accordance with the regulations approved by the Red Sea University senate. The Committee recommends that the candidate be awarded the relevant degree. The Examination Committee members were:

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This thesis has been accepted by the Red Sea University senate

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Abstract of thesis presented to the Senate of Red Sea University  
In Partial Fulfillment of the Requirement for the Degree of Master in Computer Sciences  
Designing and applying A multi Agent System for Container Terminals  
Case Study: Sea Ports Corporation  
Khadeeja Hussein Ali Taleb  
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Sea ports corporations are important nodes in international shipping .The transfer of goods from one node (location) of transport to another node have been the primary function of seaports and more specifically terminals.

There are many problems found in container terminal management that represented in uncontrolled of how to manage and organize containers terminal.

To achieve goals, the study made changes in ship agents system itself by integrating the information being exchanged between various terminals and some Oracle products has been used.

As a result, the thesis provide a model that aims to replace the old inter-organizational routines with new more efficient ones, also improving the knowledge of the logistic processes through a facilitation of the exchange of documents and information between all the involved actors.

Since this thesis proposed solution to eliminate information feeding delay and maximize system availability, it recommends implementing the mechanism to large business as well as small ones ,implement security module and Database to enhance database availability.

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مستخلص الرسالة مقدم لمجلس أساتذة جامعة البحر الأحمر

استكمالاً لمتطلبات درجة الماجستير في علوم الحاسوب

تصميم وتطبيق نظام الوكلاء المتعددين لمحطات الحاويات

دراسة الحالة: هيئة الموانئ البحرية

خديجة حسين علي طالب

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كلية الدراسات العليا

تعتبر هيئة الموانئ البحرية ركيزة أساسية في مجال الملاحة العالمية. ونجد ان ترحيل البضائع من مكان إلي آخر أصبح من صميم عمل الموانئ البحرية وخاصة ساحات التخزين.

ونجد هنالك عدة مشاكل تواجه ادارة محطات الحاويات تتمثل في عدم التحكم في ادارة ساحة الحاويات وتنظيمها. وتهدف الدراسة الى التقليل من تكلفة التشغيل مع تلبية التسليم في الوقت المحدد وزيادة تبادل المعلومات عبر مجموعة متنوعة من المعاملات. لتحقيق تلك الأهداف أجرت الدراسة تغييرات في منظومة الوكلاء الملاحيين شملت الربط وتبادل المعلومات الكترونيا بين مختلف أجزاءه مع استخدام بعض منتجات "شركة أوراكل"، وقد تم إستخدام المنهج الوصفي.

نتج عن ذلك, استبدلت الاطروحة النظام المشترك القديم بين مجتمع الميناء بنظام أكثر كفاءة يحسن المعرفة بالعمليات اللوجستية من خلال تسهيل تبادل الوثائق والمعلومات بين جميع الجهات المعنية والقضاء علي الزمن الذي يستغرقه توقف النظام.

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### List of Abbreviations

|             |                             |
|-------------|-----------------------------|
| GC          | Gantry cranes               |
| YT          | Yard truck                  |
| DFD         | Data flow diagram           |
| QC          | Quay cranes                 |
| SC          | Straddle carriers           |
| YC          | Yard cranes                 |
| TC          | Transfer crane              |
| AVG         | Automatic guided vehicle    |
| ALV         | Automated lifting vehicle   |
| ETA         | Expected time of arrival    |
| ETB         | Expected time of berth      |
| ETC         | Expected time of completion |
| EST         | Expected sailing time       |
| RTG         | Rubber tired gantry crane   |
| RMG         | Roll mounted gantry crane   |
| Oracle apex | Oracle application express  |
| ER          | Entity relationship         |
| EDI         | Electronic data interchange |
| AI          | Artificial Intelligence     |