NKAP BOLTING SYSTEM

SYSTEM DOCUMENTATION

GROUP 01

DS³ Solutions

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DELIVERABLE 6

The NKAP Bolting final system requirements, set of validation tables, a CRUD Matrix in the appendices and a comprehensive conversion plan are all included in the following document.

NKAP BOLTING
SPECIALISTS IN FASTENING SYSTEMS

TABLE OF CONTENTS

TABLE OF FIGURES

1. DOCUMENT INTRODUCTION

In this deliverable we will be focusing on the documentation of our system. This document will provide an overview of the updated final documentation. It will show the system requirements, completed validated documentation, validation table and CRUD matrix of the entire system. At the end it will show a comprehensive strategy on how to convert the existing system into the new system.

2. SYSTEM REQUIREMENTS

2.1. INTRODUCTION

This section contains our final system requirements, which has been signed off by all relevant parties.

2.2. FINAL SYSTEM REQUIREMENTS (SET OF FINAL & SIGNED OFF SYSTEM REQUIREMENTS)

1. LOG-IN

1.1. Log-In

1.2. Forgot Password

1.3. Reset Password

1.4. Log-Out

2. SUPPLIER

2.1. Add Supplier

2.2. Search Supplier

2.3. Update Supplier

2.4. Delete Supplier

2.5. Place Supplier Order

2.6. Receive Supplier Order

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3.11. Delete User Role

4. EMPLOYEE DELIVERY SHIFTS

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4.4. Delete Delivery Shift

4.5. Add Employee

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4.9. Assign Order for Delivery

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5.1. Search Online Sales

5.2. Pack Order

5.3. Do Stock-Take

5.4. View Delivery Shift Schedule

5.5. Write-Off Stock

6. CUSTOMER

6.1. Search Product

6.2. Search Specials/Promotions

6.3. Add Item to Cart

6.4. Remove Item from Cart

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6.6. Checkout Order

7. REPORTS

7.1. Generate Fast Selling Product List

7.2. Generate Slow Selling Product List

7.3. Generate Most Frequent Buyers List

7.4. Generate Most Popular Location Graph

7.5. Generate Weekly Sale Orders List

7.6. Generate Monthly Sale Orders List

7.7. Generate Stock-Level Report

7.8. Packing Report

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8.1. View Delivery Details

8.2. Add Courier

8.3. Search Courier

8.4. Update Courier

8.5. Delete Courier

8.6. Order Collected

8.7. Order Delivered

9. PRODUCT

9.1. Add Product Category

9.2. Search Product Category

9.3. Update Product Category

9.4. Delete Product Category

9.5. Add Category Type

9.6. Search Category Type

9.7. Update Category Type

9.8. Delete Category Type

9.9. Add Product Item

9.10. Search Product Item

9.11. Update Product Item

9.12. Delete Product Item

10. SPECIALS

10.1. Add Specials

10.2. Search Specials

10.3. Update Specials

10.4. Delete Specials

10.5. Send Promotional Emails

2.3. CONCLUSION

This section concludes the final system requirements section.

3. COMPLETE DOCUMENTATION

3.1. INTRODUCTION

This section contains information of all the documents present in Deliverable 6 that are related to the system. This includes Deliverable 1 – Project proposal, Deliverable 2 – Functional Specification, Deliverable 4 – Technical Specification and other appendices.

3.2. DELIVERABLE DOCUMENTATION

1. SYSTEM REQUIREMENTS
2. COMPLETED DOCUMENTATION:
    - Team 1 - DELIVERABLE 1 - PROJECT PROPOSAL (APPENDIX A)
    - Team 1 - DELIVERABLE 2 - FUNCTIONAL SPECIFICATIONS (APPENDIX B)
    - Team 1 - DELIVERABLE 3 - PROTOTYPE (APPENDIX C)
    - Team 1 - DELIVERABLE 4 - TECHNICAL SPECIFICATIONS (APPENDIX D)
3. Team 1 - VALIDATION (APPENDIX E)
4. Team 1 - CRUD MATRIX (APPENDIX F)

3.3. CONCLUSION

This concludes the section above that contains information of all the documents present in Deliverable 6 that are related to the system. This includes Deliverable 1 – Project proposal, Deliverable 2 – Functional Specification, Deliverable 4 – Technical Specification and other appendices.

4.VALIDATION

4.1. INTRODUCTION

This section will detail the validation of each procedure for each of the requirements in the NKAP Bolting system.

4.1. COMPLETE VALIDATION TABLE

Please refer to the appendix for this section

- APPENDIX E – VALIDATION
  Click on the image to view the file

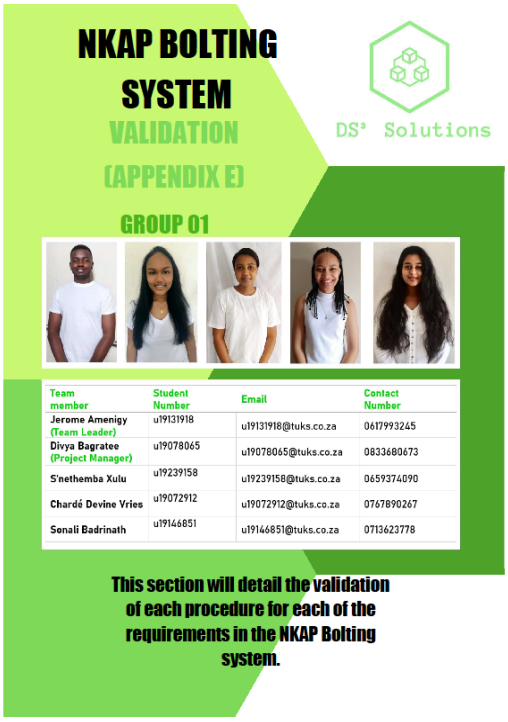


Figure 1 APPENDIX E – VALIDATION

4.2. CONCLUSION

The section above has the details of the validation of each procedure for each of the requirements in the NKAP Bolting system.

5. CRUD MATRIX

5.1. INTRODUCTION

The CRUD matrix for our system, will be used to determine the tables and their attributes in the database.

5.2. CRUD MATRIX

PLEASE REFER TO THE APPENDIX FOR THIS SECTION

- APPENDIX F – CRUD MATRIX

  Click on the image to view the file

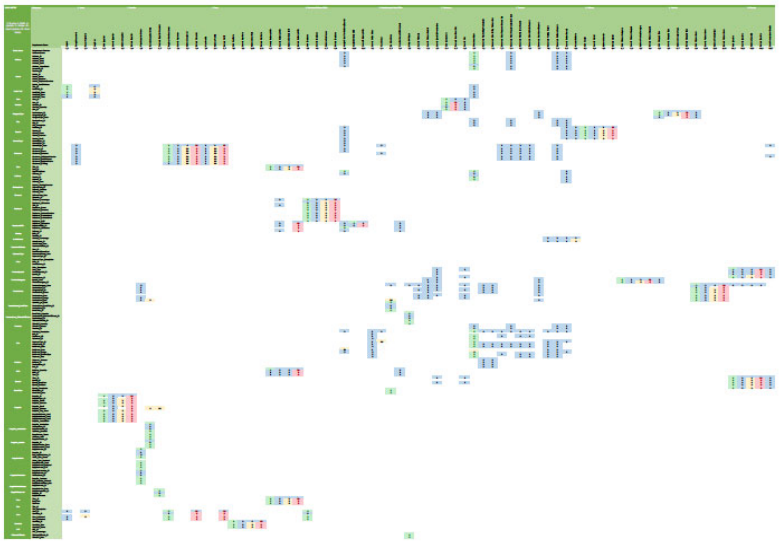


Figure 2 APPENDIX F – CRUD MATRIX

5.3. CONCLUSION

The information above included a thorough CRUD matrix for determining the tables in our database and their important attributes that are used in our system.

6. CONVERSION PLAN

6.1. INTRODUCTION

In this section we will detail the conversion plan which will entail the strategy to be followed in converting from the old system to the new system. The conversion plan will include the installation of the databases, end-user training as well as documentation to be developed.

6.2. BACKGROUND INFORMATION

The conversion plan will be executed once the project team DS3 Solutions has completed a successful system test. The NKAP Bolting System is comprised of the following:

→ NKAP Bolting System Website comprises of:

1. Customer Side: This is built with an ASP.NET CORE API, MSSQL (database) and Angular Framework. The customer side comprises the functionality which registered customers and website visitors have access to.
2. Employee/Administration Side: This is built with an ASP.NET CORE API, MSSQL (database) and Angular Framework. The employee/administration side comprises the functionality which NKAP administrators and employees have access to.
3. The NKAP Bolting System SQL Server Database which will be hosted on Azure.(For Deliverables 8 & 9)

6.3. DETAILED EXPLANATION OF CONVERSION PLAN

The conversion plan will follow the Parallel Installation Strategy. The Parallel Installation Strategy entails running the old and new systems concurrently for a period of time. This process is beneficial to our client as their current system is

comprised of many manual processes, therefore the parallel installation strategy would ensure seamless transfer from manual processes to automated processes. This will allow our client to gradually transition their customers to the online system and reduce the risk of losing current clients due to an abrupt transition. Since our client, NKAP Bolting does not currently have an online Point of Sales system in place, the NKAP Bolting System will be run concurrently with the current system for 3 months to allow the NKAP Bolting management to inform customers of the new online system and slowly terminate the need for telephonic ordering processes. After approximately three months the NKAP Bolting system will replace all manual processes.

Current Manual Processes:

- Customers place orders telephonically or purchase products at the NKAP Bolting store.
- Delivery arrangements are done manually via telephonic communication.
- Payments for orders are received upon delivery of orders/ in store using the business card machine.
- Couriers are contacted telephonically to arrange for orders to be couriered.
- Customers are not informed of order statuses; customers call to query order status and are informed that their orders are available for delivery/collection telephonically.

New Automated Processes:

- Customers can now place orders online. Employees will inform customers who place orders telephonically that they can place their orders through the website and inform them that the business will not be taking telephonic orders after 3 months.
- Customers are notified via email that their orders are ready for collection.
- Deliveries further than 50km away can be couriered by sending emails to couriers via the system.
- Payments are made through the online payment gateway on the system.
- Customers can update their details via the system as opposed to telephonically notifying NKAP Bolting of delivery address and contact number changes.

NKAP Bolting will run their manual and the new automated processes concurrently until customers are aware of the new business processes and the online system. After approximately 3 months the automatic processes which have been deemed adequate, will replace the manual processes.

6.4. THE PURPOSE OF THE CONVERSION PLAN

The conversion plan has been designed by DS3 Solutions for our Client NKAP Bolting to ensure seamless integration of the NKAP Bolting System in the business as well as to ensure users of the system are able to use and interact with the system with ease.

6.5 INSTALL DATABASES

During the installation of the database, data from our clients Legacy database will need to be transferred to the NKAP Bolting System SQL Server database which will eventually be hosted on Microsoft Azure. Records from the existing legacy database will be provided by the NKAP Bolting Administration to data entry clerks to populate the new database with the existing data. Since NKAP Bolting is currently using a legacy database, the data will have to be cleaned and restructured to remove redundancies and unnecessary records. Once this process is completed, the migration of data can be executed to successfully populate the new database.

6.6 SYSTEMS ACCEPTANCE TEST PLAN

The systems acceptance test plan will be the final test performed by end users of the system before the NKAP Bolting system is placed into effect. The Test Plan will include:

1) Verification Testing: where the system will be tested on whether it fulfills the requirements specified before development. The DS3 Solutions Team will conduct Verification Testing by referencing the signed and approved requirements list and ensuring that the functionalities specified are available on the system. The functionalities will be tested using simulated data to ensure all processes are in line with the agreed upon requirements.

2) Validation Testing: where the system will be tested using real data. Validation Testing will test the following aspects -
    - **System Performance:** this refers to the speed at which processes are carried out and the response time of the system. NKAP Bolting Employees and Administrators will need to perform functions on the system in order to assess whether these functions are carried out in an appropriate time frame. If the system response time is found to be too slow, then specific system functions will need to be rewritten to improve processing speed.
    - **Human Engineering Test:** this refers to the degree of user-friendliness of the system. This will be tested by giving employees and admins the opportunity to interact with the client side application to test whether the navigation and processes on the client end are easily understandable and will aid in a fast and easy customer experience. On the back-end, admin and employees will be given access to the site to assess whether the functionalities can be easily found through navigation and that use of forms and labels are thorough and easily understandable.
    - **Method and Procedures Test:** this refers to the testing of functions and operations on the system. This will be tested by performing the system operations and assessing whether the output of the operations are in line with the system requirements. The operations will also be tested for efficiency and effectiveness.
    - **Peak Workload Processing Performance:** this test refers to the systems ability to operate efficiently during peak traffic times. This will be tested by giving admins, employees and customers access to the system at the same time to allow them to perform different functionalities concurrently. This will allow the DS3 Solutions team to assess whether the database can handle multiple transactions at once and the stability and response time of the system.

3) Audit Testing: where the system will go through the final test before it will be deployed. During the audit testing phase, the system is screened to identify any errors and shortcomings. After the system successfully passes the audit test, it will be deemed fully capable of handling the business procedures and requirements of NKAP Bolting and can be placed into operation.

6.7 USER TRAINING

The DS3 Solutions Team will provide basic training to the NKAP Bolting Administration team and Employees to familiarize them with the system and how to carry out tasks on the system.

Duration of Training	Training Provided By	Members to be Trained	Training Description
4 Hours	DS3 Solutions Team	NKAP Bolting Administration	• During this training session the DS3 Solutions Team will show the NKAP Admin how to navigate through the system as well as show the Admin what functionalities are available to them and how to use them. • The DS3 Solutions Team will explain and familiarize the Admins with the icons used throughout the system and the function of these icons. • The DS3 Solutions Team will explain the purpose of the System notifications including the Error, Validation and Confirmation Notifications.

			• The DS3 Solutions Team will walk through the 'CRUD' functions with the admin by demonstrating how to add, search, update and delete data on the system. • The DS3 Solutions Team will also demonstrate to the admin staff how to perform the more complex functions on the system such as: - Write-off Stock - Perform Stock Takes - Capture Supplier Payments - Generate Specific Reports - Assigning shifts to Employees
2 Hours	DS3 Solutions Team	NKAP Bolting Employees	• During this training session the DS3 Solutions Team will show the NKAP Employees how to navigate through the system as well as

			show them what functionalities are available to them and how to use them. • The DS3 Solutions Team will explain and familiarize the Employees with the icons used throughout the system and the function of these icons. • The DS3 Solutions Team will explain the purpose of the System notifications including the Error, Validation and Confirmation Notifications. • The DS3 Solutions Team will demonstrate to the NKAP Employees how to view the Shift Schedule, search sales and manage orders on the system.

Figure 3 User Training Table

6.8. CONCLUSION

The section above provided an analysis of the conversion strategy.

7. PROJECT RELATED ISSUES

7.1. INTRODUCTION

This section describes information relating to the issues that our group experienced.

7.2. ISSUES (SIGN-OFF BY ALL MEMBERS OF PROJECT TEAM (INDICATING THAT THEY ACCEPT THE PROJECT PLAN AND ITS IMPLICATIONS))

Remote Working:

Due to COVID-19 restrictions, our group members have been working in 3 different provinces. We have 2 team members in KwaZulu Natal, 2 members in Gauteng and 1 member in Northern Cape. This has made collaboration and communication difficult; particularly when it comes to programming. There is a delay during virtual meetings. For some group members difficulties such as slow laptops and internet poor connection which meant that work was delayed; trying to collaborate through applications such as Google Meets was challenging. There was an added expense for data in order to attend meetings and work effectively.

Due to using laptops constantly for many hours, it has caused our laptops to overheat and slow down. This led to two members having to purchase new laptops. A common problem experienced is the freezing of screens which lead to many hours of waiting to continue working.

Programming Knowledge & Experience:

As a group there were a lot of new programming concepts that we had to learn quickly in order to apply it in our system. There were certain elements that we were not familiar/exposed to in our programming modules such as integrating third party applications; this resulted in time being taken to research, learn and understand new concepts under time constraints. All team members had to put in extra hours as we are not confident programmers; when starting deliverable 5 we were overwhelmed and nervous about implementing all of our system requirements.

Burn-out:

Since, we worked through recess and also throughout the examination period; towards the end of the deliverable we experienced burnout and fatigue. Members started to feel overwhelmed and frustrated; team morale and dynamics were

affected. Team members tried to motivate each other to keep pushing and focus on the goal of graduating.

KwaZulu Natal Riots:

Our client, NKAP Bolting, is situated in the industrial area of a town called Port Shepstone. The town was greatly affected by the KwaZulu Natal riots where 1 group member lives. Rioters planned to cause an explosion near NKAP Bolting but town members managed to save citizens. We were worried about how this would impact our client and how our 2 group members would be able to complete the project in the midst of the chaos.

Time Management

When the second semester started on the 16th of August; group members had to juggle other modules as well as programming for INF 370. It became difficult as group members found themselves neglecting other modules to program and maintain a healthy state of mind. As a team we had to find ways to stay on top of our other modules as well as put in the required hours to program our system.

Power Outage

There have been a lot of power outages in the area where one of our group members resides. The power outages have been approximately 10 hours sometimes less. This has caused the group member to not be able to use her laptop as the power outages were unexpected.

7.3. CONCLUSION

This concludes the section of information relating to the issues that our group experienced.

8. TEAM SIGN-OFF

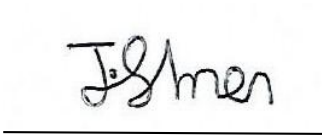
8.1. INTRODUCTION

This section contains the team sign-off.

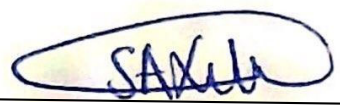
8.2. TEAM SIGN-OFF

We, Team 1 – DS³ Solutions, hereby declare that this work is our own and we are fully satisfied with the work contained within this document. We declare that all members of this group have contributed equally and fairly to this deliverable and submit this document as our final and complete System Documentation Deliverable.

Divya Bagratee – Project Manager



Jerome Amenigy – Team Leader



S'nethemba Xulu

Chardé Vries

Sonali Badrinath

CONCLUSION

This section concludes. It contained the Team Sign-Off

9. COMPLEXITY

9.1. INTRODUCTION

The complexity matrix has been filled out according to the capabilities of the DS3 Solutions members.

9.2. INF370 Complexity Matrix 2021

Topic	Level		Marks	Marks given	MAX
1. Special GUI	For online applications: Responsive web design For desktop applications: Form design according to design principles (Schneiderman's golden rule on navigation applies here)	*	3		42
	Appropriate use of grids/tables	✓	3		
	Appropriate use of tabs/links	✓	3		
	Use of graphs in an appropriate business context	✓	4		
	The storage and display of graphical information, like photos with a good business reason	✓	3		
	Working e-mail automatically generated from the database in an appropriate business context	✓	2		
	SMS messages automatically generated from the system in an appropriate business context		2		
	Extensive user-friendly search facility	✓	3		
	At least one use of a tree to display data from the database	✓	3		
	Able to dynamically modify a data tree structure and in doing so adjusting the data in the database	✓	4		
	At least one use of a calendar view of data (not a date/time picker; not a plug-in such as Google calendar)	✓	3		
	Uploading a file into the system with appropriate business reason	✓	3		
	The use of audio/video in an appropriate business context		3		
	At least one use of an administrator configurable timer in an appropriate business context		3		
2. Database access	At least 30 tables used (4 member groups) or 40 tables used (5 member groups)	*	6		15
	Full referential integrity on all tables	*	6		
	At least one use of master-detail table relationships (Schneiderman's golden rule on system status applies here)	*	3		
3. Reports	At least 3 simple list reports in a reporting tool (no control breaks, no graphs, single table)	*	3		15
	At least 2 transactional report with 2 or more control breaks (with heading and calculated values/totals, multiple tables)	*	6		
	At least 1 report with adjustable criteria	✓	3		
	At least 1 management report using a graph	✓	3		
4. Flexibility	All data that can change in future should not be hard coded but maintained in a sub-module of the system (e.g. Lookup tables)	✓	6		12
	Some business rules are not hard coded, but maintained in a sub-module of the system.	✓	6		
5. Error handling	**All** system-generated errors are trapped and consistent, user-friendly error messages are displayed	✓	6		12
	Appropriate data validation on **all** input fields	✓	6		
6. Help	At least one menu item or other control that opens up a complete help document (HTML, PDF, Help-file)		3		15
	Extensive context-sensitive help. E.g. calling Help on a specific screen/function will automatically open the specific help for that screen/function.		6		
	Search Facility on Help		3		
	Extensive use of hints		3		

7. Security	Logon screen with user ID and password and fixed user profiles	✓	3		**13**
	Applying two factor authentication with applicable business reason.	✓	3		
	Encrypted passwords in database	*	1		
	Flexible user profiles (i.e. you can dynamically add user profiles that will enable/disable access to certain parts of the system)	✓	6		
8. Audit Trail	An audit trail of all transactions in the system showing at least date, time, user, transaction type, critical data (such as amount and quantity of transaction)	✓	6		**9**
	Able to search the audit trail on any of the following: date, user, transaction type		3		

Topic	Level		Marks	Marks given	MAX
9. Deployment	For a desktop application: Fully functional installation disks that take care of application installation requirements (install and uninstall)		3		**15**
	For an online application: Deployment of application to a publicly accessible web server		3		
	For a mobile application: Deployment to an App Market place (such as the PlayStore or the AppStore)		6		
	Deployment of the database to a remote database server		3		
10. Backup and Restore	A backup and restore subsystem exists that backup/restore all data (system may exit during restore)		3		**3**
11. Import/Export Data	Able to open Word or Excel and automatically place data in it based on the parameters provided (with a good business reason)		6		**9**
	XML or JSON: At least 1 XML or JSON file for Importing or Exporting of data (with good business reason)		3		
12. External INPUT device	Simple Link to an external INPUT device using plug-and-play technology, such as a swipe card reader, bar code reader, etc. or a native component such as a QR reader, a GPS component, etc		3		**18**
	Loose Link to an external INPUT device using device specific software. Data or images must seamlessly be stored in the database but device specific software is visible to the user. (This could include a digital camera, scanner, voice recording device, thump print reader, etc.)		6		
	Tight Link to an external INPUT device using device specific software. Data or images must seamlessly be stored in the database but device specific software is **not** visible to the user. (This could include a digital camera, scanner, voice recording device, thump print reader, etc.)		9		
13. External APPLICATION / Services	Integrate an existing web service into your application (with good business reason)	✓	3		**9**
	A fully functional link to an installed external application system exists and the interface must be shown to work on the external system. Note that this excludes Microsoft Office Applications	✓	6		
14. Multiplatform processing for an appropriate business reason	Appropriate business use of static views on an alternative platform.		3		**27**
	Appropriate use of dynamic views on an alternative platform (i.e. data is displayed from the system's database)		3		
	Appropriate use of substantial dynamic views on an alternative platform (i.e. both reading and writing data from the system's database)		9		
	Uploading a file through an alternative platform onto the system's database.	✓	3		
	Substantial processing on a third platform (i.e. both reading and writing data from the system's database)		9		
15. Programming Principles	The use of a data layer to facilitate interaction between your database and your business layer	✓	3		**12**
	The use of an API to facilitate interaction between your business layer and your presentation layer	✓	6		
	Comprehensive use of stored procedures and/or triggers and/or jobs.		3		
16. Innovative addition to the system	Any very advanced innovative addition to the system (e.g. machine learning, AI, block chain, text mining, IOT, etc.)	#	1-9		**9**
				0	

Maximum Complexity Marks	**235**
Complexity Marks Required for Del 5 (5 members in team)	130
Complexity Marks Required for Del 5 (4 members in team)	100
Selected Complexity Marks	128

9.3. CONCLUSION

DS3Solutions has selected 128 complexity matrix marks out of the 222 marks.

10. SIGN-OFF BY CLIENT

10.1. INTRODUCTION

This section contains our Client Sign-Off

10.2.FORMALLY SIGNED PAGE OF CLIENTS AGREEMENT TO CONTENT

Deliverable Name: System Documentation

Deliverable Number: 6 of 12

Delivered on Date: 1/11/2021

Client Name: NKAP Bolting

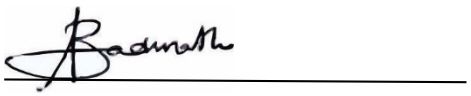
Approving Client Representative: Mr Anandh Badrinath

Project Manager: Divya Bagratee

Group Leader: Jerome Amenigy

Deliverable Sign-Off

I ANANDH BADRINATH, as the approving client representative on behalf of NKAP Bolting, declare that I have read this document in its entirety and hereby state that I understand and fully agree with its content.



Anandh Badrinath

01 September 2021

Signed on This Date

10.3.CONCLUSION

This section concludes. It contained the Client Sign-Off.

11. DOCUMENT CONCLUSION

In this deliverable we focused on showing the final documentation for the system. We additionally showed the CRUD Matrix and a conversion plan on how to change from the existing system to the new system which will be, NKAP Bolting System.

12. APPENDICES

12.1.INTRODUCTION

The information below contains information of the appendices in the deliverable.

12.2. TABLE OF APPENDICES

APPENDICES	APPENDICES NUMBER
Project Proposal	A
Functional Specification	B
Prototype	C
Technical Specification	D
Validation	E
Crud Matrix	F

12.3.CONCLUSION

This concludes the section above of the appendices in the deliverable.