Assignment Title:

Assignment 1

Course:

CCS3307 Data Warehousing

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Name :

M.B.Thrithwaka Preethi Shakya

Part A : Stakeholder Engagement and Understanding the Needs

1.Identify and Interview a Stakeholder

Name - Mr.Eran Dhammika

Designation - Production Manager

Company - Al Fattan Ship Industry

Business Domain - Shipbuilding and Marine services

Interview Questions and Answers

Section 1 - General Background

Q1) Could you provide a brief summary of your position at Al Fattan Ship Industry?

I am the Production Manager, and I oversee the entire shipbuilding process from design to delivery. I schedule, communicate with the engineering and quality departments, and manage over 200 employees. We build military and commercial ships, so incredibly high safety and quality standards are necessary.

Q2) What other departments do you collaborate most often with in the company?

I coordinate closely with Engineering on technical specs, Procurement on materials, Quality Control on inspections, and Finance on pricing. I also support the PMO on timelines and coordinate with Maintenance to ensure equipment is running efficiently.

Section 2 - Current Data and Reporting Practices

Q3) What kind of data do you use regularly in your daily operations?

I base my calculations on production data such as daily production, man-hours, and progress. I also base my calculations on inventory data, quality reports, maintenance reports, and labor productivity data.

Q4) What types of reports do you create or rely on?

I produce daily production, weekly material, and monthly quality reports. I also produce quarterly productivity reports and periodical project status reports for the management.

Q5) How are these reports currently generated?

I create most reports manually in Excel. I collect data from paper forms and various systems that don't communicate with each other. I spend an average of 2-3 hours daily gathering and collating data from various sources.

Q6) How often do you experience delays or incomplete data in your reports?

I regularly lose 1-2 days via manual entry. Data is occasionally incomplete or erroneous, specifically from non-automated devices. During peak times, this causes decision-making issues of critical nature. Section 3 - Decision-Making Needs

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Q7) What key decisions do you make that require data support?

I daily make decisions on production scheduling, resource allocation, quality control, equipment maintenance, budgeting, and ordering materials based on accurate information.

Q8) What specific insights or trends would be most valuable for your decision-making?

I would like to gain insight into production efficiency, material usage, quality trends, equipment performance, labor productivity, seasonal demand, and cost containment. Section 4 - Pain Points and Challenges

Section 4 - Pain Points and Challenges

Q9) What are the biggest challenges you face when accessing or using data?

It is challenging for me to work with disjointed and unconsolidated data from numerous different sources. It's cumbersome in Excel, paper forms, and various systems. It takes too long to bring it all together and obtain precise information.

Q10) Which processes take too much time due to current data handling methods?

I spend a number of hours daily working on reports. Weekly and monthly reports take an entire day. Material planning is also tedious as I need to verify inventory, compare schedules, and calculate requirements manually.

Q11) Can you describe situations where poor data affected your operations?

Yes. Bad material data caused a steel shortage and two-week delay last year. Lack of maintenance records caused a breakdown. Poor tracking of inspection once caused rework, and staffing errors reduced efficiency.

Section 5 - Awareness and Interest in Data Analytics

Q12) How do you think a better reporting or analytics system could help your role?

With real-time information and automatic reporting, I could make decisions more quickly and efficiently. It would be a time saver, more precise, and allow me to spot problems earlier with predictive analytics and trends.

Q13) What concerns do you have about implementing new data systems?

I worry about staff learning new technology, downtime during the first installation, data migration, cost, and most importantly data security due to our military contracts. But I believe the long-term advantages outweigh them.

Section 6 - Specific Industry Requirements

Q14) What unique data requirements does shipbuilding have compared to other industries?

I have to deal with complex materials like marine-grade steel, long project timelines, military and maritime codes, demanding quality requirements, and detailed documentation of inspections, tests, and safety procedures.

Q15) How do you currently handle project tracking for multiple vessels?

I maintain individual Excel spreadsheets for every project, and I update them based on supervisors' feedback. Since my project software lacks an interface with other systems, I waste a great amount of time cross-checking various sources.

Section 7 - Future Vision and Expectations

Q16) What would your ideal data system look like?

My ideal system would bring together production, inventory, quality, equipment, and labor information in one place. I require real-time dashboards, alerting, automated reporting, predictive analytics, mobile accessibility, and an easy-to-use interface.

Q17) What specific metrics would you want to track in a data warehouse?

I'd track production output, average build time, defect and rework rates, customer feedback, inventory turnover, waste, equipment downtime, labor productivity, safety incidents, and budget variances.

Q18) How do you envision using business intelligence tools in your daily work?

I'd start every day with a dashboard overview, drill into issues with interactive reports, use trend analysis for planning, receive alerts for problems, and view data on the go with mobile access

Section 8 - Implementation Considerations

Q19) What would be your biggest priorities for a data warehouse implementation?

My priorities are: production tracking first; material management second; quality integration third; equipment maintenance fourth; and fifth, workforce management. I favor a phased approach to minimize disruption.

Q20) How would you measure the success of a new data system?

I'd look for 50% time saved on reports, improved data accuracy, faster decisions, increased efficiency, better project outcomes, cost savings, and a full return on investment within 2-3 years.

Summarize Findings

Al Fattan Ship Industry has a great strategic need for enhanced information systems to support its advanced shipbuilding activities. The production manager highlighted the importance of timely, accurate data to support enhanced decision-making for scheduling, material planning, and quality control. Delays or errors in current manual reporting mechanisms tend to lead to inefficiencies, late delivery, and resource misallocation.

Nowadays, most reporting is conducted manually in Excel, from disparate paper records and old software. These are cumbersome, prone to human mistakes, and do not have integration across departments such as production, inventory, and maintenance. Thus, important decisions are often made with incomplete and inconsistent data.

The manager foresees a modern data warehousing setup that will bring all operation information under one roof, automate reports, and enable real-time dashboards. He imagines a system that will combine production status, material usage, labor efficiency, and equipment health into one system. With predictive analytics and mobility support, the solution would enhance efficiency, remove delays, and aid in strategic planning specially managing multiple advanced ship projects at one time.

Compare Systems

Feature	Operational Systems(OLTP)	Decision Support Systems(DSS)
Purpose	Handle day-to-day transactions and operations	Support data analysis and decision making
Users	Production staff,supervisors	Managers,analysts,planners
Data Type	Real time,transactional data	Historical,summarized and analytical data
Frequency	Continuous,real time use	Periodic,based on decision cycle
Scope	Narrow(Production line,Inventory check)	Broad(Cross project performance analysis)
Example form Al Fattan	- Machine log entry system - Inventory update after material use	- Predictive dashboard for delivery delays - Cost optimization reports
System Type	ERP modules,inventory systems,time tracking tools	BI tools(Power BI,Tableau),forecasting dashboards
Integration	Often isolated or departmental	Integrates multiple sources for undefined analysis

Part B: Conceptual Knowledge

4. Define a data warehouse and describe its key features relevant to the stakeholder's needs.

A data warehouse is a centralized system used to store, integrate, and manage large amounts of historical and operational data from various sources. A data warehouse is intended to facilitate clear reporting, analysis, and decision-making. In the case of the Al Fattan Shipping Industry, a data warehouse will collect and organize production, inventory, quality control, and maintenance system information into one accessible system.

Key features relevant to Mr. Eran Dhammika's needs include

- **Integrated**
  - Combines data from separate departments(production,procurement,maintenance)into a shared view.

- **Subject-Oriented**
  - Organizes data around core business processes like shipbuilding,material tracking and quality performance.

- **Time-Variant**
  - Stores historical data over time to allow analysis of past trends in production efficiency,defect rates and material usage.

- **Non-Volatile**
  - Data in the warehouse is stable—once entered, it is not changed—allowing for reliable, consistent reports.

- **Support for BI Tools**
  - Works seamlessly with tools like Power BI or Tableau for creating dashboards, KPIs, and visual insights.

5. Comparison: Data Warehouse vs Data Mart

Feature	Data Warehouse	Data Mart
Definition	A big system that stores data from the whole company	A smaller system that stores data for one department
Scope	Covers all areas (production, inventory, quality, HR,)	Focused on one area (only production)
Users	Used by top managers, analysts, and decision-makers	Used by team leaders or department staff
Data Size	Large stores many years of data from all systems	Small only stores needed data for one department
Data Source	Gets data from many systems across the company	Gets data from the main warehouse or one source
Purpose	Used for company-wide planning and decisions	Used for department-level reports and quick decisions
Example (Al Fattan)	Tracks progress, materials, quality, staff for all ship projects	racks only production progress for one ship project

Data Warehouse
(All data from company
(Al Fttan))

Production Data Mart

Materials & Inventory Data Mart

Quality Control Data Mart

Equipment Maintenance

Workforce Management Data Mart

Finance & Budgeting

6. Discuss how Business Intelligence tools depend on data warehousing systems to deliver value

Business Intelligence (BI) tools like **Power BI** and **Tableau** help companies understand their data better by turning numbers into visual reports like charts and dashboards. But for these tools to work properly, they need a **data warehouse** to provide clean and organized data.

If all of **Mr. Dhammika's production, material, and quality data** is stored in a data warehouse, BI tools can give more value in these ways:

- **Show real-time project dashboards**
  BI tools can display live dashboards showing the progress of shipbuilding projects, delays, and material status in a clear and visual format.

- **Support fast decision-making**
  Because the data is already collected and cleaned in the warehouse, tools like Power BI can quickly create reports, helping managers take faster and smarter decisions.

- **Save time on manual work**
  Instead of creating Excel reports manually every day, BI tools can automatically generate reports from the warehouse, saving time and reducing human errors.

Part C: Architecture and Components

7. Comparison of the top-down, bottom-up and hybrid architecture approaches

Approach	Description	Advantages	Disadvantages	Suitability for Stakeholder
Top-Down	Start by designing the full data warehouse architecture and build data marts afterward.	Well-planned, consistent, and integrated architecture.	Longer initial development time; slower initial delivery.	Good for stakeholders needing a fully integrated solution but may delay quick wins.
Bottom-Up	Build individual data marts first for specific needs,then integrate them into a full warehouse.	Faster delivery of specific business solutions.	Risk of inconsistent data and integration challenges.	Suitable for quick results but may cause issues with integration and data consistency.
Hybrid	Combines top-down and bottom-up.Key data marts are built early within an overall architecture.	Balances quick wins with long-term integration and planning.	Requires careful coordination to avoid complexity.	Ideal for the stakeholder, allowing phased delivery with future scalability.

Recommended Approach: Hybrid

For Al Fattan Ship Industry, the hybrid strategy is the best solution. Mr. Dhammika first needs production tracking, materials management, and quality control but can later apply the system to finance, HR, and other functions. Starting from data marts on production and inventory and later expanding to a full warehouse provides quick return on investment and flexibility. It avoids long waits and allows the company to add the system step by step, without harming business.

8. High-level architecture diagram
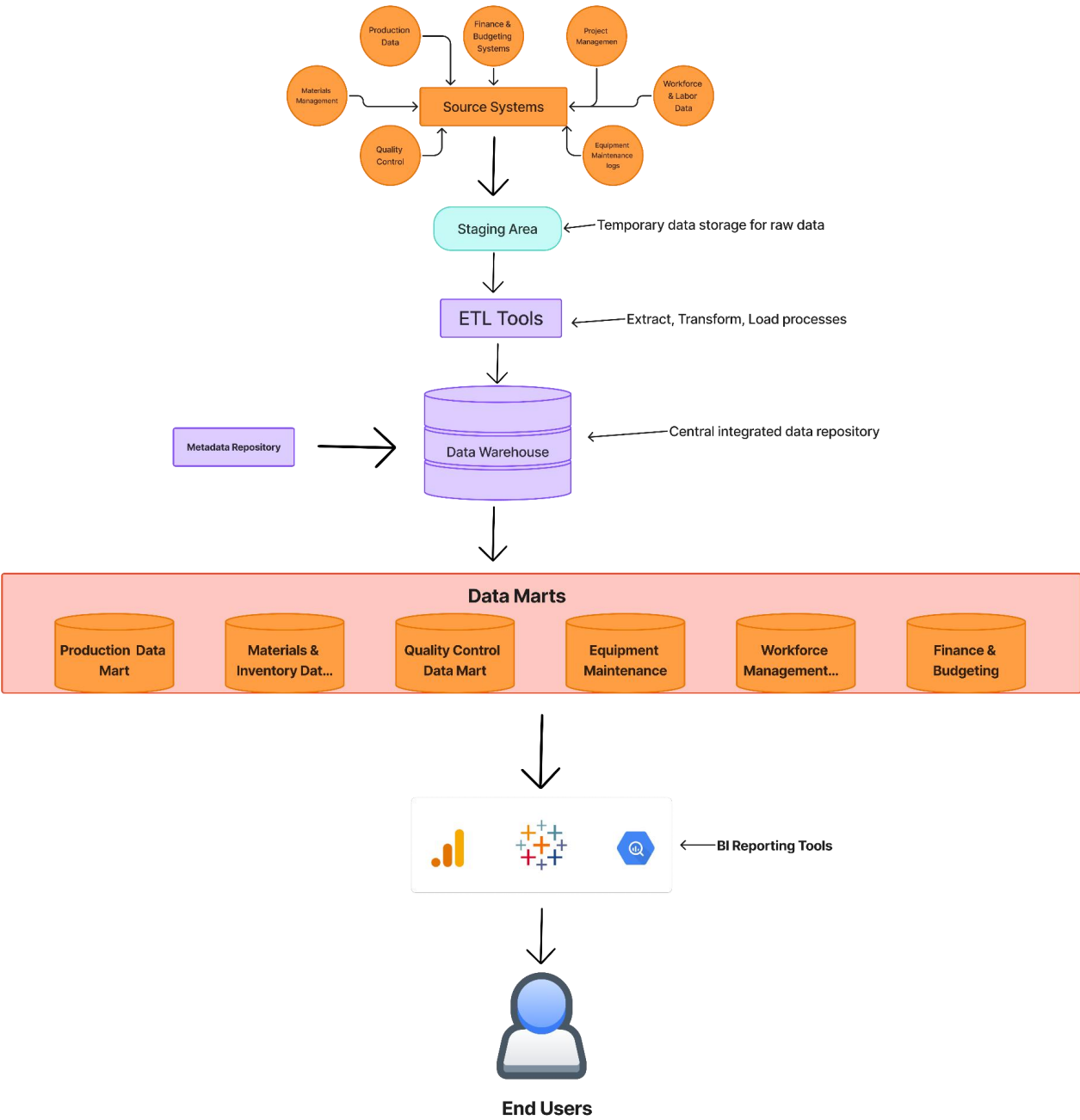
9. Describe Key Components and Their Roles

- ## Staging Area

  Staging area is a temporary place used to collect raw data before processing. In Al Fattan's scenario, these are production logs every day, inventory, and inspection records. It helps the team to check and confirm data before placing it in the system, reducing errors and increasing accuracy.

- ## ETL Tools

  ETL tools are used to pull data out of different systems, clean it, and format it before warehousing it. In Al Fattan's case, this means mapping production and material information to standardized forms. This takes the process of preparing data away from manual intervention and cuts down on the time spent creating reports.

- ## Metadata Repository

  This maintains details regarding the data i.e., where it came from, what it is, and how it is being used. For Mr. Dhammika, this gives him transparency and trust, so he knows the reports and dashboards are based on correct and trustworthy data.

- ## Data Marts

  Data marts are miniature subdivisions of the warehouse for one department. Al Fattan may have a Production Mart to monitor projects, an Inventory Mart for materials, and a Quality Mart for inspection. These enable each team to readily access only the data they need without being overwhelmed.

Part D: Project Planning and Innovation

10. Outline the key phases of data warehouse development with stakeholder context

Phase	Description	Application to Stakeholder Scenario
Requirement Gathering	Understand what data is needed and why.	Identify data needs for ship production, material tracking, and quality control.
Design	Create the architecture, data models, and plan.	Design a hybrid model with production and quality data marts.
ETL Development	Build the processes to extract, clean, and load data.	Set up ETL to bring data from Excel, inventory, and maintenance systems.
Data Warehouse & Data Marts Creation	Develop the central warehouse and subject-specific data marts.	Build warehouse and key marts for production, material usage, and quality.
Testing	Check data accuracy, system performance, and reports.	Test reports like daily production output and defect tracking.
Deployment	Launch the system to users in phases.	Start with production and material data marts first to deliver early value.
Maintenance & Support	Fix issues, train staff, and upgrade features.	Provide support to users and improve dashboards based on feedback.

11. Roles and responsibilities in a data warehouse project team matched to stakeholder activities

Role	Responsibility	Activity in Stakeholder Plan
Project Manager	Oversees the entire project and ensures timely delivery.	Manages DW implementation in phases to avoid disrupting shipyard operations.
Business Analyst	Gathers business needs and defines requirements.	Collects input from production, quality, and inventory managers.
Data Architect	Designs the structure of the warehouse.	Designs hybrid architecture for scalable shipbuilding operations.
ETL Developer	Builds and maintains data pipelines.	Develops ETL jobs to pull data from Excel, machines, and manual logs.
Database Administrator	Manages the warehouse system, security, and performance.	Ensures shipyard data is stored securely and systems run smoothly.
BI/Report Developer	Creates reports and dashboards for users.	Builds dashboards for production tracking, defect rates, and inventory usage.
QA Analyst	Tests the system and checks data quality.	Validates that reports show correct and updated information.
Trainer/User Support	Trains staff and offers technical help.	Helps production supervisors and managers learn how to use the new system.

12. Discuss at least two current trends in data warehousing (e.g., cloud-based DWs, real-time analytics, AI integration). Analyze how these trends may influence or benefit your stakeholder's organization.

- **Cloud-based Data Warehousing**

  With cloud platforms, scalable computing power and storage are enabled without massive initial investment in hardware. For the stakeholder, this translates to variable capacity to deal with expanding data across several ship projects and quicker deployment without disrupting processes

  .

- **Real-time Analytics**

  This trend is around the availability of real-time information based on real-time information. It would enable the stakeholder to monitor production status, material amounts, and quality faults almost in real-time, which would help respond faster to faults and better optimize resources.

- **AI Integration**

  AI-driven analytics can predict equipment failures, identify production bottlenecks, and optimize scheduling. For the shipyard, AI would improve maintenance planning, reduce downtime, and boost overall productivity

Conclusion

This report shows that Al Fattan Ship Industry needs a better way to manage and use their production, material, and quality data. Right now, they rely on separate tools like Excel and manual reports, which are not well connected. This leads to delays, errors, and extra time spent preparing information. Through the interview with Mr. Eran Dhammika, it became clear that faster reporting, real-time dashboards, and easier access to accurate data are important needs in their daily operations.

A hybrid data warehouse approach is the best solution because it allows the company to begin with key areas like production and material tracking, then expand step by step. Core components such as the staging area, ETL tools, metadata repository, and BI dashboards will help clean and organize data, store it safely, and provide useful reports. This system will make decision-making faster and more accurate, improve project tracking, and support the company's long-term goals with flexibility and security.

AI detection result

Assignment Title: ▾

✧ AI Tools

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New
Home
Documents
More
Help
Settings

⚡ Upgrade to Premium

◯ Basic scan   Share   Export

GPTZero AI Detection Model 3.5b

human   We are **moderately confident** this text is entirely **human**
ⓘ

Probability breakdown ⓘ

13% AI generated   0% Mixed   87% Human

View   [AI Sentences]   [AI Words]

🔒 **Advanced Sentence Scanning**
Understand how each sentence impacts AI probabilities and with interpretable reports (American Federation Teacher Certified)

◎ Your most human sentences

Q4) What types of reports do you create or rely on?

↻ Scan to update results
5,000 characters 733 words   Scan →