

# Field Trip Report: Computer Warehouse Group PLC (CWG)

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# 1 Introduction

## 1.1 Definition and Importance of Field Trips

Field trips in computer science are educational excursions outside the classroom setting. These trips can take students to various locations, such as: Tech companies (software development firms, hardware manufacturers) Research institutions (focusing on AI, cybersecurity, etc.) Tech conferences and meetups.

## 1.2 Importance for Computer Science Undergraduates

Field trips provide invaluable benefits for computer science students, offering practical insights and enriching their academic experience:

**Exposure to Emerging Technologies:** Students can witness firsthand the latest advancements in technology, such as artificial intelligence, blockchain, or Internet of Things (IoT). This exposure stimulates curiosity and inspires innovative thinking among students.

**Industry Trends and Innovations:** Visiting tech companies and research facilities exposes students to current industry trends and innovative projects. They can learn about new methodologies, tools, and approaches shaping the future of computer science.

**Ethical Considerations in Technology:** Field trips can highlight ethical dilemmas and considerations in technology development and deployment. Students can engage in discussions about privacy, data security, algorithm bias, and the societal impact of technological innovations.

**Interdisciplinary Perspectives:** Collaborations with professionals from diverse fields during field trips, such as designers, engineers, and business analysts, offer interdisciplinary perspectives. This interaction enhances students' understanding of how computer science integrates with other disciplines.

**Cultural and Global Awareness:** Field trips to international tech hubs or multinational corporations provide insights into global IT practices and cultural influences on technology adoption and development. This exposure fosters cultural competence and global awareness among students.

**Hands-on Project Opportunities:** Some field trips may include hands-on workshops or hackathons where students can collaborate on real-world projects. This practical experience strengthens their problem-solving skills and project management abilities.

**Community Engagement and Social Responsibility:** Visiting tech companies engaged in community initiatives or sustainable practices exposes students to the role of technology in addressing social challenges. It encourages discussions on corporate social responsibility and ethical tech entrepreneurship.

## 1.3 Objectives

**Practical Learning Opportunities:** Field trips provide students with practical, real-world applications of theoretical concepts learned in class. They can observe how theories like database management, network configurations, or software development methodologies are implemented in actual settings.

**Integration of Theory and Practice:** By bridging the gap between theory and practice, field trips enhance students' understanding of complex subjects. Seeing firsthand how systems, technologies, and processes operate helps clarify abstract concepts and theoretical frameworks.

**Career Exploration and Networking:** Field trips expose students to various career paths within IT, from software developers and network engineers to data scientists and cybersecurity specialists. Interacting with professionals and industry leaders provides networking opportunities and insights into career pathways.

**Cultural and Social Context:** Depending on the destination, field trips can offer valuable cultural and social context relevant to the tech industry. Understanding regional influences and global perspectives enriches students' appreciation of diverse IT practices and innovations.

**Personal Growth and Inspiration:** Experiencing innovative environments and interacting with industry experts can inspire students to explore new ideas, pursue entrepreneurial ventures, or engage in research that pushes the boundaries of technology.

**Critical Thinking and Ethical Awareness:** Engaging in discussions about ethical considerations in technology development cultivates critical thinking skills and raises awareness about the societal impacts of technological advancements.

## 1.4 Mode of Study

**Company Presentations:** Introduction sessions by key personnel: Monu Moses (Head of IT) providing insights into CWG's history, core values, and strategic milestones.

**Guided Tours:** Tour of CWG facilities, including data centers, network operation centers (NOCs), and development labs.

**Interactive Sessions:** Question and Answer sessions with employees from various departments (IT, software development, operations) to understand their roles, projects, and challenges.

**Demonstrations:** Demonstrations of technologies used at CWG, such as cloud computing platforms, database management systems, and cybersecurity measures.

**Hands-on Activities:** We students engaged in hands-on activities like software demos, simulated troubleshooting scenarios, and practical exercises related to CWG's products and services.



## 2 Organization

### 2.1 History

Computer Warehouse Group Plc, also known as CWG PLC boasts a rich history in the Nigerian and African ICT (Information and Communication Technology) landscape. Here's a timeline of their journey

**1992:** The company starts its journey as Computer Warehouse Limited, founded by Austin Okere. Initially, they focus on computer hardware projects.

**Few Years Later:** DCC Networks, a subsidiary dedicated to communication solutions like VSAT networks and local area networks (LANs), is established.

**1999:** Recognizing the growing need for software expertise, CWG acquires Expert Edge Software. This broadens their offerings to include software systems, training, and solutions.

**2003:** CWG expands its reach beyond Nigeria by establishing a branch in Ghana, catering to the broader West African market.

**2005:** To streamline operations and improve efficiency, Computer Warehouse Group is incorporated. This centralizes management of the three subsidiaries (CWL, DCC, and Expert Edge).

**2013:** CWG achieves a significant milestone by listing on the Nigerian Stock Exchange (NSE).

**Present Day:** CWG PLC has grown into a leading provider of integrated ICT solutions for businesses across sub-Saharan Africa. They operate through three primary divisions:

## **2.2 Introduction by Monu Moses**

**Role:** Head of IT and data analyst, who completed his IT and NYSC at CWG.

### **2.2.1 Founder: Austin Okere**

Austin Okere is the Founder of CWG Plc and the Ausso Leadership Academy. Austin has an MBA from IESE Business School and over 30 years of industry experience. Austin is an Entrepreneur-in-Residence at Columbia Business School, New York. He was appointed to the Advisory Board of the Global Business School Network in Washington DC in recognition of his major contribution to the development of business education and knowledge transfer in Africa.

Austin has been recognized with a Lifetime Entrepreneurship Achievement Award by the American University of Nigeria in 2017 for his dedicated service and outstanding entrepreneurial accomplishments. He received the Nigerian Computer Society Special Presidential Award in 2016 and was named ICT Personality of the year by the Society in 2014. He was also named ICT Man of the Decade by ICT Watch - Africa Digital Network in 2012 and was listed on the United Kingdom's C.Hub Magazine 100 Most Influential Creatives in 2016.

Austin is a member of the World Economic Forum's Global Agenda Council and a Fellow of the Nigerian Computer Society as well as the Institute of Directors of Nigeria. His company, CWG Plc has been recognized as a 'Global Growth Company' by the World Economic Forum and is the largest security listed in the Technology Sector of the Nigerian Stock Exchange.

### **2.2.2 CEO: Adewale Adeyipo**

Adewale is a proficient technology enthusiast and business executive with extensive experience in Strategy, Management, and Leadership. He currently serves as the Group CEO of CWG Plc - A leading ICT conglomerate, listed on the Nigeria Stock Exchange, with Headquarters in Lagos and operations in five (5) countries.

Before his current appointment, he was the Executive Director for Sales and Marketing, overseeing all responsibilities of Sales, Marketing, Product Management, and Market Penetration within the CWG Plc Group. Wale has consulted and worked very closely with industry leaders and promoters of new financial institutions in setting up banks and creating a plan to power their growth aspirations. He has consulted for several organizations, given

my diverse experience and the application of technology, as an enabler for business success and expansion.

Wale holds a BSc in Computer Science from the University of Ilorin, Nigeria, specialization in innovation and entrepreneurship from Harvard Business School and is an alumnus of Lagos Business School, Business School Netherlands, and Massachusetts Institute of Technology (MIT).

He possesses extensive study in Entrepreneurship-Valuation and Funding, Dynamic System Thinking, Digital, and ITO Transformation from Harvard and London Business School. He is a member of the Forbes Business Council (an Invitation-Only Community for Successful Business Owners and Leaders) and a certified AFN CEO Panelist.

Wale is a member and fellow of several other organizations, including the Institute of Directors, BCS, Chartered Institute for IT, Nigeria Computer Society, Nigeria Institute of Management, Institute of Credit Administration, and Institute of Management Consultant.

## 2.3 Company Overview

### 2.3.1 Core Values

**Core Values:** CWG PLC upholds core values of innovation, teamwork, and integrity. These values guide its operations and relationships with clients, partners, and employees, emphasizing a commitment to excellence and ethical conduct.

### 2.3.2 Slogan

**Slogan:** "Be more, do more." This slogan represents CWG's idea of constant enhancement and active involvement in providing innovative ideas and services.

## 2.4 Key Milestones

**1994: Network Communication** - CWG expanded its service offerings to include network communication solutions, laying the foundation for its expertise in telecommunications infrastructure.

**1998: Expert Edge** - The launch of Expert Edge marked CWG's specialization in providing tailored IT consulting and solutions to meet diverse client needs across industries.

**2005: Expansion to Ghana** - CWG established its presence in Ghana, expanding its footprint beyond Nigeria and into the broader West African market, enhancing regional service capabilities.

**2009: Case study in CWG** - CWG was recognized for its innovative approach with a comprehensive case study showcasing successful implementations and technological advancements.

**2010: Expansion to Uganda** - CWG continued its regional expansion strategy by entering the Ugandan market, strengthening its position as a leading provider of IT solutions in East Africa.

**2019: Partnered with PEC** - CWG forged a strategic partnership with PEC (Pacific Energy Company), enhancing its energy sector solutions and diversifying its portfolio of offerings.

**2022: Expansion in Dubai** - CWG expanded its global presence with a new office in Dubai, positioning itself as a key player in the Middle Eastern market and facilitating international collaboration.

**Operations:** CWG PLC operates from offices in Ghana, Uganda, Cameroon, and Dubai, employing a diverse workforce of 600 professionals dedicated to delivering excellence in brands and marketing, sales, customer support, quality assurance, human resources, IT, software development, and data center management.

**Service Areas:** CWG PLC provides comprehensive services encompassing IT consulting, digital transformation, software development, cloud computing solutions, cybersecurity, and managed services, serving a wide range of industries including banking and finance, telecommunications, energy, healthcare, and government sectors.

## 2.5 Support Partners

- **Infosys:** A global leader in consulting, technology services, and digital transformation, providing strategic support in IT solutions and services.
- **UBA (United Bank for Africa):** A major financial institution across Africa, partnering with CWG PLC to enhance banking technologies and digital services.
- **FirstBank:** One of Nigeria's oldest and largest banks, collaborating with CWG PLC on innovative banking solutions and customer service enhancements.

- **Stanbic IBTC Bank:** A leading financial services provider in Nigeria, contributing to CWG PLC's initiatives in financial technology and digital banking.
- **Globus Bank:** A dynamic and innovative financial institution in Nigeria, partnering with CWG PLC to leverage technology for banking efficiency and growth.
- **Wema Bank:** Known for its digital transformation efforts, collaborating with CWG PLC to drive digital banking solutions and customer experience improvements.
- **Heritage Bank:** Committed to innovation in financial services, supporting CWG PLC in developing cutting-edge solutions for banking and finance.
- **FCMB (First City Monument Bank):** A leading financial services provider in Nigeria, partnering with CWG PLC to enhance banking technology infrastructure and services.
- **Coronation Merchant Bank:** Providing specialized financial services and strategic collaboration with CWG PLC in financial technology solutions.
- **Fidelity Bank:** A customer-focused financial institution in Nigeria, collaborating with CWG PLC on digital banking and financial technology innovations.
- **Union Bank of Cameroon:** Extending CWG PLC's reach into Cameroon's banking sector through strategic partnerships and technology solutions.

## **2.6 Fifth Lab (CWG's Software Fintech Division)**

### **2.6.1 Establishment and Focus**

#### **Established**

Fifth Lab, the software fintech division of CWG PLC, was established in 2022. The creation of Fifth Lab marked a strategic expansion for CWG PLC into the rapidly evolving financial technology sector. By leveraging CWG's extensive experience in technology and innovation, Fifth Lab aims to develop cutting-edge fintech solutions that address the complex needs of modern financial systems.

#### **Focus**

The primary focus of Fifth Lab is on product development aimed at improving lives. This mission is driven by the belief that technology can be a powerful tool for enhancing the quality of life for individuals and communities. Fifth Lab's product development initiatives are centered around creating innovative solutions that make financial services more accessible, efficient, and secure. By prioritizing user-centric design and leveraging the latest technological advancements, Fifth Lab strives to deliver products that not only meet market demands but also have a meaningful impact on society.

## 2.6.2 Product Development Lifecycle

### Stages

The product development lifecycle at Fifth Lab encompasses several key stages, each critical to the successful creation and deployment of fintech products. These stages are:

**1. Ideation** Ideation is the initial phase where ideas for new products or enhancements to existing products are generated. This stage involves brainstorming sessions, market research, and the identification of user needs and pain points. During ideation, teams at Fifth Lab explore various concepts and evaluate their feasibility and potential impact. The goal is to generate a pool of innovative ideas that can be further refined and developed.

**2. Product Design** Once a promising idea is identified, it moves into the product design phase. This stage involves detailed planning and conceptualization of the product. Key activities include defining the product's features and functionality, creating wireframes and prototypes, and developing a user interface (UI) and user experience (UX) design. The design phase is critical for ensuring that the product is intuitive, user-friendly, and aligned with the target audience's needs.

**3. Product Development** The product development stage is where the actual coding and building of the product take place. During this phase, developers at Fifth Lab translate the design specifications into functional software. This involves writing code, integrating various components, and ensuring that the product meets the defined requirements. Agile methodologies are often employed to allow for iterative development and continuous feedback, ensuring that the product evolves in line with user expectations and market trends.

**4. Testing (Alpha and Beta)** Testing is a crucial phase in the product development lifecycle, aimed at identifying and resolving any issues or bugs before the product is launched. Testing is typically conducted in two stages:

- **Alpha Testing:** This is the initial phase of testing, carried out by the internal team. Alpha testing focuses on identifying bugs, performance issues, and other defects. It ensures that the product functions correctly and meets the specified requirements. The feedback from alpha testing is used to make necessary adjustments and improvements.

- **Beta Testing:** Once the product passes alpha testing, it moves to beta testing, where it is released to a select group of external users. Beta testing aims to gather real-world feedback and identify any issues that may not have been detected during alpha testing. This stage helps validate the product's performance, usability, and overall user experience in a real-world environment.

**5. Product Launch** After successful testing and validation, the product is ready for launch. The product launch phase involves final preparations for releasing the product to the market. This includes creating marketing and promotional materials, setting up distribution channels, and preparing support and maintenance resources. The launch is a critical milestone that marks the culmination of the product development process. A successful launch ensures that the product reaches its target audience and achieves its intended impact.

## 2.7 Conclusion

Fifth Lab, CWG's software fintech division, is dedicated to developing innovative products that improve lives. Established in 2022, Fifth Lab follows a comprehensive product development lifecycle that includes ideation, product design, product development, testing, and product launch. Each stage is meticulously planned and executed to ensure the delivery of high-quality fintech solutions that meet market needs and enhance the quality of life for users.



## 2.8 Products

### 2.8.1 Product Catalog

- **FinEdge:** Core banking application.
- **KuleanPay:** Anti-scam application.
- **BillsnPay:** Airtime vending platform.
- **SMERP:** Small Medium Enterprise Resource Planning platform.
- **SMERP Go:** Simplified version of SMERP.
- **UCP:** Unified Cooperating Platform.
- **Gaming:** Helps the government collect taxes from betting platforms.

## 2.9 FinEdge: Comprehensive Banking Software Solution by CWG PLC

CWG PLC is an industry leader in providing IT services in Africa, and one of its notable products is FinEdge. The goal of its development was to make banking processes more streamlined and efficient. It provides a unified platform that supports many functions and includes modules for managing diverse areas of a bank's activity.

## 2.10 Core Features of FinEdge

### 2.10.1 Customer Relationship Management (CRM)

- **Customer Data Management:** Centralized storage for customer information.
- **Customer Support:** Tools for handling customer inquiries and issues.
- **Marketing Automation:** Features for targeted marketing campaigns and customer engagement.

### 2.10.2 Account Management

- **Account Opening and Maintenance:** Streamlined processes for opening new accounts and maintaining existing ones.
- **Account Statements and Reporting:** Automated generation of account statements and detailed financial reports.

### 2.10.3 Transaction Processing

- **Payments and Transfers:** Management of various types of transactions including domestic and international transfers.
- **Real-time Processing:** Real-time processing of transactions to ensure quick and accurate service.

### 2.10.4 Lending and Credit Management

- **Loan Origination and Servicing:** Tools for the end-to-end management of the loan lifecycle.
- **Credit Scoring and Risk Assessment:** Integrated tools for assessing credit risk and determining loan eligibility.

### 2.10.5 Treasury and Investment Management

- **Cash Management:** Efficient management of the bank's cash flow.
- **Investment Tracking:** Tools to manage and track investments.

### 2.10.6 Compliance and Risk Management

- **Regulatory Compliance:** Ensures that the bank adheres to local and international regulations.
- **Risk Management:** Tools to identify, assess, and manage risks.

### 2.10.7 Analytics and Reporting

- **Business Intelligence:** Advanced analytics for better decision-making.
- **Regulatory Reporting:** Automated generation of reports required by regulatory authorities.

### 2.10.8 Security and Fraud Prevention

- **Data Security:** Robust measures to protect customer data.
- **Fraud Detection:** Tools to detect and prevent fraudulent activities.

### 2.10.9 Digital Banking Solutions

- **Online Banking:** Features for customers to manage their accounts online.
- **Mobile Banking:** Mobile applications for on-the-go banking services.
- **ATM and Card Services:** Integration with ATM networks and card management systems.

## 2.11 Benefits of Using FinEdge

- **Operational Efficiency:** Automation of routine tasks allows staff to focus on more strategic activities.
- **Customer Satisfaction:** Enhanced customer service capabilities improve customer experience.
- **Regulatory Compliance:** Built-in compliance features ensure adherence to regulatory requirements.
- **Scalability:** Can scale with the growth of the bank, adding new features as needed.
- **Data-Driven Decisions:** Advanced analytics provide insights that help in strategic decision-making.
- **Security:** Robust security features protect against data breaches and fraud.

## 2.12 KuleanPay: Advanced Fraud Prevention Solution

KuleanPay is a strong defense against scams, crafted with the sole purpose of addressing security and thwarting deceit. As the level of deceitful actions becomes more complex, KuleanPay offers sophisticated features and solutions to safeguard individuals and entities from monetary offenses.

## 2.13 Core Features of KuleanPay

### 2.13.1 Real-Time Fraud Detection

- **Transaction Monitoring:** Continuous monitoring of transactions to detect suspicious activities.
- **Pattern Recognition:** Uses machine learning algorithms to identify fraudulent patterns and behaviors.

### 2.13.2 User Authentication

- **Multi-Factor Authentication (MFA):** Enhances security by requiring multiple forms of verification.
- **Biometric Verification:** Incorporates fingerprint, facial recognition, and other biometric methods.

### 2.13.3 Alert and Notification System

- **Instant Alerts:** Sends real-time alerts to users and administrators about suspicious activities.
- **Customizable Notifications:** Allows users to customize notification settings based on their preferences.

### 2.13.4 Risk Assessment

- **Risk Scoring:** Assigns risk scores to transactions based on various parameters.
- **Behavioral Analysis:** Analyzes user behavior to detect anomalies and potential fraud.

### 2.13.5 Reporting and Analytics

- **Comprehensive Reports:** Generates detailed reports on fraud detection and prevention activities.
- **Data Visualization:** Provides visual tools to help users understand fraud trends and patterns.

## 2.14 Benefits of Using KuleanPay

### 2.14.1 Enhanced Security

- **Proactive Fraud Prevention:** Detects and prevents fraud before it occurs.
- **Reduced Financial Losses:** Minimizes the financial impact of fraudulent activities.

### 2.14.2 Improved User Trust

- **User Confidence:** Builds trust among users by ensuring their transactions are secure.
- **Compliance:** Helps organizations comply with regulatory requirements related to fraud prevention.

### 2.14.3 Operational Efficiency

- **Automated Processes:** Automates fraud detection processes, reducing the need for manual intervention.
- **Resource Optimization:** Allows organizations to allocate resources more effectively.

## 2.15 BillsnPay: Comprehensive Airtime Vending Platform

BillsnPay is a platform for selling airtime that is specifically made to handle mobile top-ups. Making it easy and accessible to buy mobile phone airtime, it gives a smooth and efficient experience overall.

## 2.16 Core Features of BillsnPay

### 2.16.1 Mobile Top-Up Services

- **Multiple Network Support:** Supports top-ups for various mobile networks, ensuring wide coverage.
- **Instant Recharge:** Provides instant recharge options for quick and easy airtime purchase.

### 2.16.2 User-Friendly Interface

- **Intuitive Design:** Features an easy-to-use interface that simplifies the top-up process.
- **Mobile App Integration:** Offers mobile applications for convenient on-the-go recharges.

### 2.16.3 Payment Options

- **Multiple Payment Methods:** Accepts various payment methods including credit/debit cards, mobile money, and bank transfers.
- **Secure Transactions:** Ensures secure payment processing to protect user data and transactions.

### 2.16.4 Transaction History

- **Detailed Records:** Maintains a comprehensive history of all transactions for user reference.
- **Reporting Tools:** Provides tools for generating reports on airtime purchases and usage patterns.

### 2.16.5 Promotions and Discounts

- **Promotional Offers:** Features special promotions and discounts to attract and retain customers.
- **Loyalty Programs:** Implements loyalty programs to reward frequent users.

## 2.17 Benefits of Using BillsnPay

### 2.17.1 Convenience

- **Easy Access:** Allows users to purchase airtime anytime, anywhere.
- **Time-Saving:** Reduces the need for physical visits to airtime vendors.

### 2.17.2 Wide Network Coverage

- **Multiple Networks:** Supports a range of mobile networks, catering to diverse user needs.
- **Global Reach:** Can be used for international mobile top-ups, enhancing its utility.

### 2.17.3 Enhanced Security

- **Secure Payments:** Ensures that all transactions are processed securely.
- **Data Protection:** Protects user data with advanced security measures.

### 2.17.4 Customer Satisfaction

- **User-Friendly Experience:** Provides a smooth and enjoyable user experience.
- **Rewards and Discounts:** Offers incentives that enhance customer satisfaction and loyalty.

## 2.18 SMERP & SMERP Go: Comprehensive Enterprise Resource Planning Platforms

SMERP and SMERP Go are Small Medium Enterprise Resource Planning (ERP) software developed to respond to the demands of SMEs. SMERP offers a greater variety of tools for comprehensive business management, while SMERP Go provides a more streamlined version appropriate for smaller organizations.

## 2.19 Core Features of SMERP

### 2.19.1 Inventory Management

- **Stock Control:** Efficient tracking of inventory levels, orders, sales, and deliveries.
- **Automated Replenishment:** Automated alerts and reorder points to maintain optimal stock levels.

### 2.19.2 Sales Management

- **Order Processing:** Streamlined order entry, processing, and tracking.
- **Customer Management:** Comprehensive customer relationship management (CRM) tools.

### 2.19.3 Financial Management

- **Accounting:** Integrated accounting module for managing financial transactions.
- **Financial Reporting:** Generation of detailed financial statements and reports.

### 2.19.4 Human Resources Management

- **Payroll Processing:** Automated payroll calculation and processing.
- **Employee Management:** Tools for managing employee information, attendance, and performance.

### 2.19.5 Supply Chain Management

- **Supplier Management:** Efficient management of supplier relationships and orders.
- **Logistics:** Tools for managing logistics and distribution.



### 2.19.6 Reporting and Analytics

- **Business Intelligence:** Advanced analytics for informed decision-making.
- **Customizable Reports:** Ability to generate customized reports based on specific business needs.

## 2.20 Core Features of SMERP Go

### 2.20.1 Streamlined Business Management

- **Essential Features:** Focuses on essential ERP features tailored for smaller businesses.
- **User-Friendly Interface:** Simplified interface for easy navigation and usage.

### 2.20.2 Scalability

- **Modular Approach:** Allows businesses to add modules as they grow.
- **Cost-Effective:** Affordable solution with the flexibility to expand as needed.

### 2.20.3 Cloud Integration

- **Cloud-Based Solution:** Offers cloud integration for remote access and collaboration.
- **Data Security:** Ensures data security and backup with cloud storage.

## 2.21 Benefits of Using SMERP & SMERP Go

### 2.21.1 Operational Efficiency

- **Automation:** Automates routine tasks, reducing manual effort and errors.
- **Improved Productivity:** Enhances productivity by streamlining business processes.

### 2.21.2 Informed Decision-Making

- **Real-Time Data:** Provides real-time data for quick and accurate decision-making.
- **Analytics:** Advanced analytics tools for deeper business insights.

### 2.21.3 Scalability and Flexibility

- **Adaptability:** Adapts to the changing needs of businesses as they grow.
- **Customizable:** Offers customization options to fit specific business requirements.

### 2.21.4 Cost Savings

- **Reduced Operational Costs:** Lowers operational costs through automation and efficiency.
- **Affordable Solutions:** Provides cost-effective solutions for small and medium-sized enterprises.

## 2.22 UCP (Unified Cooperating Platform)

### 2.22.1 Overview of UCP

UCP (Unified Cooperating Platform) is designed to facilitate collaboration and information sharing between different entities. Its primary goal is to unify processes, enhance communication, and improve efficiency across various departments or organizations.

### 2.22.2 Core Features of UCP

#### Collaboration Tools

- **Document Sharing:** Secure and easy sharing of documents and files.
- **Real-Time Editing:** Collaborative editing of documents in real-time.

### Communication Channels

- **Messaging:** Instant messaging for quick communication between users.
- **Video Conferencing:** High-quality video conferencing for virtual meetings.

### Integration Capabilities

- **API Integration:** Easy integration with other software and platforms through APIs.
- **Data Synchronization:** Ensures that data is consistent across all integrated platforms.

### Project Management

- **Task Management:** Tools for assigning and tracking tasks and projects.
- **Milestone Tracking:** Allows teams to track progress and meet deadlines.

## 2.22.3 Benefits of Using UCP

### Enhanced Collaboration

- **Unified Communication:** Brings all communication tools into a single platform.
- **Improved Coordination:** Facilitates better coordination among teams and departments.

### Increased Efficiency

- **Streamlined Processes:** Unifies processes to reduce redundancy and increase efficiency.
- **Real-Time Updates:** Provides real-time updates and notifications to keep everyone informed.

### Scalability

- **Flexible Integration:** Can be integrated with various systems as the organization grows.
- **Adaptable:** Adapts to the changing needs of the organization.

## 2.23 Gaming

### 2.23.1 Overview of Gaming

The Gaming product is designed to assist the government in collecting taxes from online betting platforms. It ensures compliance with tax regulations and streamlines the tax collection process.

### 2.23.2 Core Features of Gaming

#### Tax Calculation

- **Automated Tax Calculation:** Automatically calculates the taxes owed by online betting platforms.
- **Compliance Verification:** Ensures that all transactions comply with tax regulations.

#### Reporting and Documentation

- **Detailed Reports:** Generates detailed reports on betting transactions and tax obligations.
- **Audit Trails:** Maintains comprehensive audit trails for transparency and accountability.

#### Integration with Betting Platforms

- **Seamless Integration:** Integrates seamlessly with various online betting platforms.
- **Data Synchronization:** Ensures that transaction data is accurately captured and reported.

#### Security Measures

- **Data Protection:** Implements robust security measures to protect sensitive data.
- **Fraud Detection:** Includes tools to detect and prevent fraudulent activities.

### 2.23.3 Benefits of Using Gaming

#### Regulatory Compliance

- **Ensures Compliance:** Helps online betting platforms comply with tax regulations.
- **Reduces Risk:** Minimizes the risk of non-compliance and associated penalties.

#### Efficient Tax Collection

- **Streamlined Process:** Simplifies the tax collection process for both the government and betting platforms.
- **Automated Reporting:** Reduces the need for manual reporting and documentation.

#### Transparency and Accountability

- **Detailed Reporting:** Provides detailed reports that enhance transparency.
- **Audit Trails:** Ensures accountability with comprehensive audit trails.

## 3 Discussion

### 3.1 Understanding the Structure of CWG PLC

CWG PLC operates through three primary divisions, each with a distinct focus area

#### 3.1.1 CWL Systems

CWL Systems leverages a vast array of hardware technologies, including

- Servers: From high-performance computing servers to industry-standard rack servers, they cater to diverse processing needs.
- Storage Systems: CWL provides storage solutions like Network Attached Storage (NAS) and Storage Area Networks (SANs) for efficient data management.
- Networking Equipment: Switches, routers, and firewalls form the core of their networking solutions, ensuring secure and reliable data connectivity within organizations.
- Additionally, CWL Systems might offer solutions with: Converged and Hyperconverged Infrastructure (HCI): These integrated solutions combine compute, storage, and networking resources for simplified IT management.
- Security Solutions: Firewalls, intrusion detection/prevention systems (IDS/IPS), and data encryption solutions safeguard client data.

#### 3.1.2 DCC Networks

Focuses on managed services, network design and implementation, and connectivity solutions. They ensure seamless communication and data transmission for their clients.

- Cloud Management Platforms (CMPs): These platforms help manage and optimize resources across various cloud environments, ensuring efficient service delivery.
- Network Monitoring Tools: Proactive network monitoring tools allow DCC to identify and troubleshoot connectivity issues before they disrupt operations.
- Software-Defined Networking (SDN): SDN solutions provide DCC with greater control and flexibility in managing network traffic.
- Additionally, DCC Networks might leverage: Managed Security Services (MSS): Providing clients with ongoing security monitoring and incident response capabilities.
- Unified Communications (UC): Integrating voice, video, and data communication solutions for enhanced collaboration within organizations.

### 3.1.3 Expert Edge Software

Offers software solutions like cloud services (including SMERP) and enterprise resource planning (ERP) solutions. They streamline business processes and empower data-driven decision making.

- Cloud Platforms: They might leverage established cloud platforms like Microsoft Azure or Amazon Web Services (AWS) to host their cloud-based offerings (OpenMall, SMERP).
- Enterprise Resource Planning (ERP) Systems: Expert Edge offers ERP solutions that integrate various business functions like finance, accounting, human resources, and supply chain management. These systems are often built on specific platforms like SAP or Oracle.
- Business Intelligence (BI) Tools: These tools facilitate data analysis and reporting, providing valuable insights for businesses.
- Customer Relationship Management (CRM) Systems: CRM systems help manage customer interactions and relationships, improving customer service and sales effectiveness.

## **3.2 Conclusion**

Gaming product assists in the efficient collection of taxes from online betting platforms. Both products enhance operational efficiency, ensure compliance, and provide robust features tailored to their specific purposes.

## **3.3 CWG Academy**

### **3.3.1 Topics Covered**

#### **What is IT?**

Information Technology (IT) involves the use of computers, networking, storage, and other physical devices, infrastructure, and processes to create, process, store, secure, and exchange all forms of electronic data. IT encompasses both the technology (hardware and software) and the way that technology is used to manage and process information.

#### **Why Study IT?**

Studying IT opens up a vast array of career opportunities in various fields such as software development, network administration, data analysis, cybersecurity, and more. It also equips individuals with problem-solving skills, enhances creativity, and provides a competitive edge in the job market.

#### **Careers in IT**

The IT industry offers numerous career paths, including software development, network engineering, data analysis, IT project management, cybersecurity, system administration, database management, and cloud computing. Each career path offers unique challenges and opportunities for growth.

#### **How to Build a Career in IT**

Building a career in IT involves gaining relevant education and certifications, acquiring practical experience through internships and projects, continuous learning to stay updated with the latest technologies, networking with professionals in the field, and developing soft skills such as problem-solving, communication, and teamwork.



## 3.4 Key Insights from Mr. Daniel Odigbo, Senior Software Developer

## 3.5 Database Languages

### 3.5.1 Languages

- **SQL (Structured Query Language):** SQL is a standard language used for managing and manipulating relational databases. It is widely used for querying, updating, and managing data.
- **PLSQL (Procedural Language/Structured Query Language):** PLSQL is an extension of SQL used in Oracle databases. It includes procedural programming features, allowing for more complex and advanced database operations.
- **T-SQL (Transact-SQL):** T-SQL is an extension of SQL used in Microsoft SQL Server. It adds additional features for transaction control, error handling, and row processing, enabling the creation of complex and efficient queries.

## 3.6 SQL Usage

### 3.6.1 Fetching Records

- **Select Queries:** SQL is used to retrieve data from databases using SELECT statements. These queries can fetch specific columns, rows, and even perform complex joins and subqueries to gather the required information.
- **Filtering Data:** With the WHERE clause, SQL can filter records based on specific conditions, allowing users to extract only the relevant data.
- **Sorting Data:** The ORDER BY clause enables sorting of the result set by one or more columns, either in ascending or descending order.

### 3.6.2 Writing Insert Queries

- **Inserting Data:** SQL's INSERT INTO statement allows for the addition of new records into a table. Users can insert single rows or multiple

rows of data at once.

- **Bulk Insertions:** SQL supports bulk insert operations to efficiently load large datasets into tables, often used in data warehousing and ETL processes.

## 3.7 PLSQL Usage

### 3.7.1 Complex Transactions

- **Procedures and Functions:** PLSQL enables the creation of stored procedures and functions, which encapsulate complex business logic and can be reused across applications. These procedures and functions can include variables, loops, and conditional statements.
- **Triggers:** PLSQL supports the creation of triggers, which are special types of stored procedures that automatically execute in response to certain events on a table, such as inserts, updates, or deletes. Triggers are used for maintaining data integrity and enforcing business rules.
- **Exception Handling:** PLSQL provides robust exception handling capabilities to manage errors and exceptions in a controlled manner. This feature helps in maintaining the stability and reliability of database operations.

### 3.7.2 Advanced Data Manipulation

- **Cursors:** PLSQL allows the use of cursors to handle query results one row at a time. This is useful for processing individual records in a set and performing row-by-row operations.
- **Bulk Operations:** PLSQL supports bulk collect and bulk bind operations, which allow for efficient processing of large volumes of data. These operations can significantly improve the performance of batch processing tasks.

## 3.8 Cloud Computing

### 3.8.1 Differences

#### Public vs. Private Cloud

Cloud computing can be broadly categorized into public and private clouds, each offering distinct advantages and considerations:

#### Public Cloud

- **Definition:** Public cloud services are provided by third-party providers over the internet. These services are available to multiple customers, who share the same infrastructure.
- **Cost:** Public cloud is typically more cost-effective because the infrastructure costs are spread across many users. Users pay on a pay-as-you-go basis, which can be highly economical for varying workloads.
- **Scalability:** Public clouds offer virtually unlimited scalability. Users can easily scale resources up or down based on demand without worrying about the underlying infrastructure.
- **Maintenance:** Maintenance and updates are managed by the cloud provider, reducing the burden on the user's IT staff.
- **Security:** While public clouds implement robust security measures, the shared nature of the infrastructure may pose concerns for businesses with stringent security and compliance requirements.
- **Examples:** Amazon Web Services (AWS), Microsoft Azure, Google Cloud Platform (GCP).

#### Private Cloud

- **Definition:** Private cloud services are dedicated to a single organization. The infrastructure can be hosted on-premises or by a third-party provider but is not shared with other organizations.
- **Cost:** Private clouds can be more expensive due to the need for dedicated hardware and infrastructure. However, they may offer cost savings for organizations with stable, predictable workloads.

- **Scalability:** While private clouds can be scaled, the process is generally less flexible and more costly compared to public clouds. It may require purchasing additional hardware.
- **Maintenance:** Maintenance can be managed in-house or outsourced to a third-party provider, depending on where the private cloud is hosted.
- **Security:** Private clouds offer enhanced security and compliance controls, making them suitable for organizations with sensitive data and strict regulatory requirements.
- **Examples:** VMware vSphere, Microsoft Private Cloud, OpenStack.

## Converged vs. Hyper-Converged Infrastructure

Converged and hyper-converged infrastructures represent different approaches to integrating and managing computing, storage, and networking resources:

### Converged Infrastructure

- **Definition:** Converged infrastructure integrates compute, storage, networking, and virtualization resources into a single, cohesive system, managed through a unified interface. However, these components remain distinct within the integrated system.
- **Components:** The individual components of a converged infrastructure can be used independently and are often pre-configured and tested by the vendor.
- **Management:** Centralized management simplifies administration, but each component still requires specific expertise for optimal performance.
- **Scalability:** Converged systems scale by adding new nodes or modules. Each module may contain separate compute, storage, or network resources.
- **Examples:** Dell EMC Vblock, Cisco FlexPod, HPE ConvergedSystem.

### Hyper-Converged Infrastructure (HCI)

- **Definition:** Hyper-converged infrastructure (HCI) integrates compute, storage, networking, and virtualization resources into a single software-defined solution. All components are tightly integrated and managed as a unified system through software.

- **Components:** In HCI, resources are abstracted from the hardware and managed through a hypervisor, providing greater flexibility and simplicity.
- **Management:** HCI solutions offer simplified, centralized management through a single interface, reducing the need for specialized expertise in individual components.
- **Scalability:** HCI scales more efficiently by adding nodes that contain compute, storage, and networking resources, allowing for seamless expansion of the infrastructure.
- **Examples:** VMware vSAN, Nutanix, HPE SimpliVity.

## 3.9 Data Center

### 3.9.1 Components

#### Cooling Systems

Data centers rely on specialized cooling systems to maintain optimal operating temperatures for IT equipment. Common types include:

- **CRAC (Computer Room Air Conditioning):** CRAC units control the temperature and humidity levels within the data center environment. They ensure that IT equipment operates within specified temperature ranges to prevent overheating and potential damage.
- **HRAC (High-Density Rack Air Conditioning):** HRAC systems are designed to cool high-density server racks that generate a significant amount of heat. They provide targeted cooling to specific areas within the data center where heat concentration is highest.

#### Humidifiers

Maintaining proper humidity levels is crucial for preventing static electricity and controlling electrostatic discharge (ESD) within the data center. Humidifiers help regulate humidity to ensure optimal conditions for sensitive IT equipment.

## **Signal and Power Cables**

Data centers are equipped with extensive networks of signal cables for data transmission and power cables to supply electricity to IT equipment. These cables are organized and managed to minimize interference and ensure reliable connectivity and power distribution.

## **Access Control**

Access control systems restrict physical access to authorized personnel only. This includes security measures such as biometric scanners, access cards, and surveillance cameras to monitor and control entry into the data center.

## **Security Measures**

Data centers employ robust security measures to protect against unauthorized access, theft, and physical threats. Security measures may include perimeter fencing, security guards, video surveillance, and intrusion detection systems (IDS). These measures help safeguard sensitive data and ensure the integrity of IT operations.

## **3.9.2 Operations**

### **Reliability**

Data centers strive for high reliability and availability to ensure continuous operation of IT services. This includes designing and maintaining infrastructure to withstand potential disruptions and minimize downtime. Some data centers aim for operational reliability without any unplanned outages for extended periods, often measured in years.

### **Fire Suppression (FM200)**

FM200 is a clean agent fire suppression system commonly used in data centers. It works by releasing a gaseous agent that suppresses fires without leaving residue or causing damage to IT equipment. FM200 systems are preferred for their effectiveness in protecting valuable assets and minimizing downtime in the event of a fire emergency.

## **3.10 Network Operation Center (NOC)**

### **3.10.1 Roles**

#### **Internet Services**

The Network Operation Center (NOC) plays a crucial role in managing and maintaining internet services within an organization or service provider. This includes ensuring the availability, performance, and security of internet connectivity for users and customers. NOC engineers monitor network traffic, troubleshoot connectivity issues, and implement solutions to optimize internet service delivery.

#### **Traffic Monitoring**

NOC teams are responsible for monitoring network traffic to identify patterns, anomalies, and potential issues that may impact network performance or security. By analyzing traffic data in real-time, NOC engineers can proactively detect and mitigate network congestion, bottlenecks, or malicious activities that threaten network integrity.

#### **Hosted Applications**

NOCs oversee the availability and performance of hosted applications, including software as a service (SaaS), platform as a service (PaaS), and infrastructure as a service (IaaS) offerings. They ensure that hosted applications operate within defined service level agreements (SLAs) and respond promptly to any incidents or service disruptions that may affect application availability or user experience.

#### **Storage Management**

Effective storage management is essential for maintaining data integrity, accessibility, and scalability within an organization's IT infrastructure. NOC engineers monitor storage systems, optimize storage resources, and implement backup and recovery strategies to safeguard critical data. They ensure that storage solutions meet capacity requirements and performance expectations to support business operations.

## 3.11 Careers

### 3.11.1 Network Engineers

Network engineers play a critical role in designing, implementing, and maintaining computer networks within organizations. Their responsibilities include:

- Designing and planning network infrastructure to meet business requirements.
- Installing and configuring network equipment such as routers, switches, and firewalls.
- Monitoring network performance and troubleshooting network issues.
- Implementing security measures to protect against cyber threats and unauthorized access.
- Collaborating with other IT professionals to ensure seamless connectivity and data integrity.

Network engineers typically possess strong technical skills in networking protocols, routing, switching, and security technologies. They play a key role in optimizing network performance and ensuring reliable communication across an organization's IT infrastructure.

### 3.11.2 Data Center Roles

Roles within a data center encompass various responsibilities related to managing and maintaining IT infrastructure and operations. Key roles include:

- **Data Center Technician:** Responsible for day-to-day operations, including equipment installation, maintenance, and troubleshooting within the data center.
- **Systems Administrator:** Manages server and system operations, including configuration, maintenance, and monitoring to ensure optimal performance and reliability.
- **Network Administrator:** Oversees network operations, including configuration, monitoring, and troubleshooting to maintain network availability and performance.



- **Storage Administrator:** Manages storage systems and data repositories, including capacity planning, data backup, and disaster recovery strategies.
- **Data Center Manager:** Provides leadership and strategic direction for data center operations, overseeing staff, resources, and infrastructure to meet organizational goals and objectives.

Roles within a data center require technical expertise in areas such as server administration, network management, storage technologies, and data security. Professionals in these roles play a crucial part in ensuring the reliability, availability, and security of IT services and infrastructure within organizations.

## 3.12 Test Bench

### 3.12.1 Prepaid Energy Meters

#### Assembly

Prepaid energy meters undergo several stages of assembly, including:

- **SKD (Semi Knockdown) Assembly:** This involves assembling components and sub-assemblies of the prepaid energy meter. SKD assembly prepares the meter for further testing and integration.
- **Inspection:** After assembly, the meter undergoes thorough inspection to ensure all components are correctly assembled and meet quality standards.
- **Testing:** Prepaid energy meters are subjected to rigorous testing procedures to verify functionality, accuracy, and compliance with regulatory standards. Testing includes performance testing under various conditions to ensure reliable operation.
- **FBU (Fully Built Unit):** Once testing is completed and the meter meets specifications, it is assembled into a fully built unit ready for deployment and installation.

The assembly, inspection, testing, and FBU stages are critical in ensuring the quality, reliability, and performance of prepaid energy meters before they are deployed in utility networks.

## 3.13 Technology

### 3.13.1 Microwave, VSAT, and Fiber Technologies

#### Microwave Technology

Microwave technology is widely used in telecommunications for high-speed data transmission over long distances. It utilizes microwave radio signals operating in the electromagnetic spectrum to transmit data between two locations. Key features include:

- **High Bandwidth:** Microwave links can provide high bandwidth capacity, making them suitable for transmitting large volumes of data quickly.
- **Line-of-Sight Communication:** Microwave signals travel in a straight line and require unobstructed line-of-sight between transmitting and receiving antennas.
- **Reliability:** Microwave technology offers reliable communication with minimal signal degradation over long distances, making it ideal for telecommunication networks.
- **Applications:** Used in backbone networks, point-to-point links, and mobile backhaul networks to support voice, data, and video services.

#### VSAT (Very Small Aperture Terminal) Technology

VSAT technology enables satellite-based communication systems for remote locations or areas with limited terrestrial infrastructure. Key features include:

- **Satellite Connectivity:** VSAT terminals communicate with geostationary satellites to transmit and receive data, providing global coverage.
- **Flexibility:** VSAT systems can be quickly deployed and are scalable to meet varying bandwidth requirements, from small-scale installations to enterprise networks.
- **Applications:** Used for internet access, enterprise networks, remote monitoring, and maritime communications where terrestrial options are impractical.

- **Challenges:** Latency due to signal travel distance and susceptibility to weather conditions affecting satellite signals.

### Fiber Optic Technology

Fiber optic technology uses optical fibers made of glass or plastic to transmit data as pulses of light over long distances. Key features include:

- **High Bandwidth Capacity:** Fiber optics offer unparalleled bandwidth capacity, capable of supporting high-speed internet, video streaming, and cloud services.
- **Low Latency:** Light signals travel at near-light speed, resulting in minimal latency compared to other transmission mediums.
- **Security:** Fiber optic cables are less susceptible to electromagnetic interference and tapping, enhancing data security.
- **Applications:** Backbone networks, metropolitan area networks (MANs), and last-mile connectivity for residential and business internet services.

### 3.13.2 Dish Farm

A dish farm refers to a collection of satellite dishes or antennas used for receiving and transmitting signals in telecommunications and broadcasting:

- **Purpose:** Dish farms are strategically positioned to capture signals from multiple satellites or to transmit signals over long distances.
- **Configuration:** Dishes are typically arranged in an array or farm-like pattern to optimize signal reception and transmission efficiency.
- **Applications:** Used in satellite communications for television broadcasting, internet services, remote sensing, and military communications.
- **Maintenance:** Regular maintenance is crucial to ensure dishes are aligned correctly and free from obstruction to maintain signal integrity.
- **Technological Advancements:** Modern dish farms may incorporate automated tracking systems and adaptive antenna technologies to enhance performance and reliability.

## **4 Summary, Conclusion, and Recommendation**

### **4.1 Summary**

The visit to CWG was extremely beneficial for me, giving me a hands-on grasp of abstract ideas. It showed CWG's cutting-edge activities, all-encompassing offerings, and sophisticated systems, giving a peek into how these concepts are used in the real world. The visit improved the my knowledge in IT service management, software creation, cloud technology, data handling, and network management.

### **4.2 Conclusion**

Attending the CWG event highlighted the necessity of merging academic theory with hands-on experience. It emphasized how CWG's methods and advancements are crucial for computer science education, equipping learners for upcoming jobs in IT. The knowledge acquired from the journey is priceless for both scholarly and career development.

### **4.3 Recommendation**

The field trip to CWG PLC provided valuable insights into the company's operations and technologies. I had the chance to observe firsthand the integration of FinTech solutions like FinEdge, KuleanPay, and BillsnPay in banking operations. They also got practical knowledge about SMERP and SMERP Go platforms for SMEs, as well as the UCP and Gaming products.

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