KOGOD SCHOOL of BUSINESS
AMERICAN UNIVERSITY • WASHINGTON, DC

# Project Requirements Specifications

**Project Name:** Transitioning Dell to a Subscription-Based Model


**Team Members**

Eitan Toubia
Mariam O. Souleyman
Peter Sarpong
Dheeraj Shetty

**Client Contact:** Josh Offsie, Dell Technologies

**Professor:** J. Alberto Espinosa, Kogod School of Business, American University



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## Communication Log

| Date | Communication Topic | Comm Type | Participants | | |
|---|---|---|---|---|---|
| | | | Team Members | Client Reps | Other |
| **Deliverable 1** | | | | | |
| 9/24 | Initial client meting | **Zoom** | **Dheeraj,Eitan, Mariam,Peter** | **Josh Offsie** | **Joel croft, Prof. E** |
| 10/1 | Q&A meeting | **Zoom** | **Dheeraj,Eitan, Mariam,Peter** | **Josh Offsie** | **Joel croft, Prof. E** |
| 10/6 | General Deliverable and work disruption meeting | **Teams** | **Eitan, Mariam,Peter** | | |
| | | | | | |
| **Deliverable 2** | | | | | |
| 10/27 | Team meeting | **Teams** | **Eitan,Mariam,Peter Dheeraj** | | |
| 10/28 | Teams Meetings, final edits | **Teams** | **Eitan,Mariam,Peter Dheeraj** | | |
| 11/10 | Meeting to go over implementation of feedback from deliverable 2 | **Teams** | **Eitan,Mariam,Peter Dheeraj** | | |
| | | | | | |
| **Deliverable 3** | | | | | |
| 11/2 | Feedback meeting | **Teams** | **Eitan, Peter, Mariam, Dheeraj** | | |
| 11/10 | Meeting to discuss feedback implementation and work division | **Teams** | **Eitan, Peter, Mariam, Dheeraj** | | |
| **Final Project Deliverable, Visual Simulation and Presentation** | | | | | |
| 12/08 | Final deliverable discussion | **Teams** | **Eitan,Mariam,Peter Dheeraj** | | |
| 12/10 | Dry Run and final discussion | **Teams** | **Eitan,Mariam,Peter Dheeraj** | | |
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# Executive Summary

## 1. Introduction

Dell Technologies is transitioning to a subscription-based business model to meet the demands of a rapidly evolving technology landscape. This shift requires addressing inefficiencies in quoting, invoicing, and vendor management that hinder operational efficiency and client satisfaction. To support this transition, our team has developed a system that automates key processes, enhances traceability, and streamlines workflows to align with Dell's strategic objectives.

The document begins with an overview of the business case and system vision, followed by a detailed analysis of the current baseline processes and identified challenges. Key stakeholders are mapped to their roles in the system, highlighting the areas of impact and expected improvements. The functional, non-functional, and data requirements are then outlined, providing a clear framework for system implementation. The proposed system incorporates a centralized database for real-time tracking and matching of payments, an intelligent quoting engine to reduce delays, and automated payment processing to enhance accuracy and transparency. Advanced analytics measure critical performance indicators such as quoting time, payment processing speed, and vendor acquisition rates, with insights displayed via an intuitive dashboard. Additionally, tools like application usage tracking and automated renewal management ensure that Dell can better align vendor partnerships with client preferences and streamline ongoing engagements.

Dell's current processes, which rely heavily on manual labor, are resource-intensive and ill-suited for the demands of a subscription-based model. Teams of 15 to 20 employees are tasked with managing the complex quoting, invoicing, and vendor management processes, resulting in significant operational costs. With average salaries of $100,618 per employee, Dell is spending between $1.5 million and $2 million annually on these teams. This allocation of resources to repetitive manual tasks not only increases the risk of invoicing errors and mismatched payments but also diverts high-value employees from more strategic roles that could contribute directly to revenue generation. By automating these workflows, Dell can reallocate these human resources to more impactful activities, improving overall operational efficiency and reducing costs.

This solution addresses the specific pain points identified during stakeholder discussions, including manual inefficiencies, lack of traceability, and delays caused by third-party coordination. By automating the quoting process, Dell can improve response times to client inquiries, ensuring faster and more accurate quotes. Automated invoicing will minimize errors and provide real-time payment tracking, enhancing Dell's reliability and strengthening vendor relationships. Additionally, a centralized platform for vendor management will reduce the administrative burden of reconciling mismatched payments, fostering stronger trust and collaboration with third-party vendors.

Designed for scalability and adaptability, the system prepares Dell for sustained growth while enhancing operational excellence and client satisfaction. By resolving immediate challenges and positioning Dell for long-term success, this system reinforces Dell's commitment to innovation and its leadership in the subscription-based technology sector.

# Project Concept

## 2. Business Case and System Vision

### *2.1 Client*

The client for this project is Dell Technologies, a global leader in the technology industry, known for providing hardware, software, and IT solutions to businesses and organizations around the world. Dell operates in nearly every country, delivering products such as personal computers, servers, data storage devices, network switches, software, and other technology solutions. The specific unit involved in this project is part of Dell's enterprise software division, which focuses on transitioning from perpetual licensing models to subscription-based services. This transition is crucial for enhancing Dell's competitive edge in the evolving software market. The key point of contact for this project is a high-level manager from Dell's software operations, who oversees the transition process, automation, and partnership integration.

### *2.2 Business Case*

Dell Technologies is shifting from one-time software licenses to a subscription-based model to remain competitive alongside industry leaders like AWS, Azure, and Google Cloud. However, Dell's current manual processes for quoting, invoicing, and vendor management are not well-suited to this model. These time-intensive tasks often result in invoicing errors, delayed quote generation, and challenges in payment processing, hindering Dell's responsiveness to customer needs. Additionally, manual payment processing often results in mismatches between invoices and payments, creating administrative burdens and straining relationships with third-party vendors.

Dell deals are typically in the multimillion-dollar range, meaning errors in payment due to ineffective record-keeping can result in the loss of multimillion-dollar payments or a client worth even more in billing to Dell.

As taken from an excerpt of our initial client meeting with Dell: Dell has a team of fifteen to twenty people who manually process something that's incredibly difficult and taxing. The current process is extremely resource-intensive, and these teams of fifteen to twenty people The average annual salary of a worker at Dell is $100,618, meaning that Dell is spending between $1,509,270 and $2,012,360 on these teams when these employees would be able to help which could be better-generating revenue for Dell in other facets if this process was automated and improved.

To overcome these challenges, Dell must implement a fully integrated solution for quoting, invoicing, and vendor management. By automating the quoting process, Dell can speed up response times, ensuring that customer inquiries are handled promptly. Automated invoicing will reduce errors and provide accurate, real-time tracking of payments, strengthening Dell's reliability in partner transactions and building trust with vendors. A centralized platform for vendor management will enhance communication by consolidating vendor agreements and payment histories, significantly reducing the administrative workload required for reconciliation.

Implementing this solution will help Dell improve operational efficiency, enhance customer response times, and foster stronger vendor relationships. This streamlined approach will enable Dell to meet the demands of the subscription model and secure its competitive position in the evolving software industry.

### *2.3 System Vision*

Our proposed system is designed to support Dell's transition to a subscription-based model by automating key processes, enhancing accuracy, and improving traceability. The system will include an intelligent quoting engine that generates quotes based on client configurations and product specifications, significantly reducing manual data entry and enabling faster response times.

A centralized database will store all transactions, quotes, payments, and vendor interactions, providing Dell's teams with a real-time, unified view of activities. This will streamline tracking and record-keeping, ensuring reliable vendor relationships and improved operational visibility.

Additionally, an automated payment and notification system will handle recurring payments, generate invoices, and send reminders for renewals or outstanding payments. By integrating client and vendor data into these workflows, Dell can achieve greater efficiency, foster stronger partnerships, and position itself competitively in the evolving subscription market.

## 3. *Stakeholder Analysis*

**Senior Sales Representative**

**Role**: Gathers customer requirements, creates solutions and generates quotes for enterprise clients.

**Stake**: Will interact directly with the new quoting system, benefiting from faster deal closures through automated quoting and real-time pricing.

**Regional Sales Manager**

**Role**: Oversees sales teams and approves non-standard pricing or configurations.

**Stake**: Will use the system to track team performance and streamline special request approvals, gaining better visibility into the sales pipeline.

**Software Licensing Specialist**

**Role**: Manages third-party software vendor relationships and ensures compliance with licensing agreements.

**Stake**: Will benefit from improved traceability between vendor and customer quotes, reducing the workload of managing licenses and renewals.

**Financial Analyst**

**Role**: Ensures accurate revenue recognition for software sales.

**Stake**: Will utilize the system's reporting features to track software sales and allocate revenue efficiently, simplifying the auditing process.

**IT Systems Integration Specialist**

**Role**: Integrates the new quoting system with Dell's existing IT infrastructure.

**Stake**: Crucial to the system's implementation, ensuring compatibility with ERP, CRM, and financial systems.

**Customer Support Specialist**

**Role**: Provides post-sale support for software purchases and licenses.
**Stake**: The system will provide accurate purchase and licensing information, enabling faster issue resolution.

**Legal Counsel**

**Role**: Ensures compliance with vendor agreements and regulations.
**Stake**: Will rely on the system's traceability features for audits and compliance checks, improving efficiency and accuracy.

**Product Manager**

**Role**: Manages Dell's server product lines, including bundled software offerings.
**Stake**: Will use analytics to identify popular software configurations and pricing trends, guiding future product and pricing strategies.

**Finance Manager**

**Role**: Oversees payments to third-party software vendors.
**Stake**: The system will improve the reconciliation of vendor invoices with sales data, reducing manual tracking efforts.

**Chief Financial Officer (CFO)**

**Role**: Oversees financial health and strategy for Dell's Infrastructure Solutions Group
**Stake**: Will use reports generated by the system to make strategic decisions on software partnerships and pricing, relying on improved financial data accuracy.

**Third-Party Vendor Account Manager**

**Role**: Manages the partnership between Dell and software vendors.
**Stake**: While not a direct user, the system's improved accuracy and efficiency will strengthen the vendor relationship and create opportunities for collaboration.

**Business Intelligence Analyst**

**Role**: Analyzes sales data and market trends to guide business strategy.
**Stake**: Will benefit from real-time data and analytics to generate reports on software sales, pricing, and market trends, supporting more accurate strategic recommendations.

# 4. Business Process Requirements

### *4.1 Baseline Process*

The Dell Operation process includes four functional areas: Customers, Sales Team, Internal Operations, and Tech Team. It spans four main phases: Sales, Fulfillment, Payment, and End, with specific subprocesses within each phase. Below is provided a detailed breakdown of all steps:

**Main Phases:**

1. **Sales Phase**:
    a. The customer contacts Dell with their requirements, and the Sales Team begins by sizing the customer's needs.
    b. **P1: Sizing Sub-Process**:
        i. The Sales Team receives the customer's requirements (P1.1).
        ii. The team creates a tailored solution (P1.2).
        iii. A decision point (D1) determines if third-party vendors are required. If so, they include third-party offerings (P1.4). If not, they proceed with Dell products (P1.3).
        iv. The Sales Team creates a Bill of Materials (BOM) (P1.5) and sends it to the customer (P1.6).
        v. A second decision point (D2) requires customer confirmation of the BOM. If confirmed, the process moves to the Quoting phase (P2). If not, adjustments are made.
        vi. If the customer does not approve the sizing the process ends
2. **Quotation Sub-Process (P2)**:
    a. After BOM confirmation, Dell calculates price and quantity (P2.1) and generates a formal quote (P2.4).
    b. If third-party products are involved, Dell collects resale quotes from vendors (P2.3); otherwise, it uses its own pricing (P2.2).
    c. The payment method is determined (D2), with upfront, monthly, or yearly options.
    d. The quote is sent to the customer (P2.6) and remains valid for 30 days.
    e. The order is processed after customer approval (P2.7).
    f. If the customer does not approve the process ends
3. **Purchase Order and Order Processing**:
    a. The customer submits a purchase order (P3).
    b. Dell's Internal Operations Team processes the order (P3.1).
    c. If the order is denied due to lack of inventory, the process ends. If confirmed, the process moves to fulfillment (P4).
4. **Fulfillment Sub-Process (P4)**:
    a. Dell's Internal Operations Team receives the order (P4.1).

b. The Tech Team builds the hardware (P4.2).
c. A decision point (D3) checks whether third-party software is needed. If so, Dell orders the software from third-party vendors (P4.3).
    i. The vendors prepare and ship the product (P4.4), along with configuration details (P4.6).
    ii. If no third-party software is required, Dell installs its own software (P4.7), and the product is bundled and shipped by Internal Operations (P4.8).
d. While the shipment is in transit, the Tech Team emails the customer with software licenses and configurations (P5.9).

5. **Invoicing and Payment Sub-Processes (P6-P9)**:
    a. After fulfillment, invoicing is split between customers and third-party vendors (D4).
        i. **For Customers**: Dell's accounting team generates an invoice (P5) that includes costs and payment terms. The customer reviews the invoice (P5.1) and submits payment (P6), which Dell tracks and reconciles (P6.5).
        ii. **For Vendors**: Dell monitors third-party software transactions (P7), issues a partner invoice request(P8), and processes payment once validated Dell pays for the Software, or Services that were resold to Dell customers. This can be done through royalty transactions, Blanket Purchase Orders, and many other customized methods. (P9).

6. **End Phase**:
    a. After payment and delivery, the customer receives the product, marking the end of the process.

Each step in the process is designed to ensure a smooth transition from the customer's request to product delivery, managing internal and external operations and payments efficiently. (For further details on the baseline BPM, please refer to Appendix B1.)

### *4.2 Scope of Work*

The scope of this project focuses on optimizing and automating specific aspects of Dell's current business process, particularly in the areas of sizing, quoting, partner invoicing and payment. Additionally, this project focuses on ensuring reliable trackability between Payments and Quotes in order to ensure that all processes of Dell's relationships with its clients run smoothly.

### *4.3. Process Analysis*

#### a) **Business Process Improvement Goal(s)**

The primary goal for our business process is to enhance efficiency and traceability in interactions between Dell and the clients throughout various stages, specifically in time management, sizing, quoting, as well as in payment processing. This will be achieved by creating a system that automatically records and displays the payment status for the client upon completion.

b) **Business Process Improvement Analysis**

In analyzing the Dell system for delivering bundled hardware, software, and services to customers, a few key bottlenecks and issues can arise across the different stages. Here's a breakdown by phase**.**

**Sizing Phase**

**Bottleneck**: *Complexity in Product and Service Configuration*

Dell bundles its products and services with third-party components, which creates potential delays in accurately sizing and validating configurations. Each customer might require a unique combination of products and services, which can lead to inconsistencies or misunderstandings if requirements aren't clearly communicated or documented.

**Issue**: *Third-Party Component Costs*

For third-party components, Dell may need to obtain separate quotes from partners, which can delay the BOM finalization. When third-party costs aren't fixed, it can be difficult to ensure consistent pricing, and any delay in receiving partner quotes extends the timeline for delivering a solution to the customer.

**Quote Phase**

**Bottleneck**: *Dependency on Upfront Payment Model*

Dell's model largely depends on up-front payment for standard deals. This can be a barrier for customers looking for more flexible financing, such as monthly or annual payments. Although special financing options exist, not having them readily available could delay customer decision-making and approval.

**Issue**: *Pricing and Validation for Third-Party Items*

If third-party components don't have pre-negotiated resale prices, Dell must obtain individual resale quotes. This can cause delays in producing an accurate, executable quote for the customer. Additionally, fluctuating costs from partners could impact Dell's pricing consistency.

Additionally, there is no path for Dells clients to renew contracts if they wish which means if the company wishes to renew the whole process had to happen again.

**Order Phase**

**Bottleneck**: *Dependency on Accurate Purchase Orders*

Customer purchase orders (POs) must match the specific quote provided by Dell. Any discrepancies in the PO (such as product specifications or payment terms) can cause delays while the sales and finance teams resolve the mismatch, delaying downstream processes.

**Customer Payment Phase**

**Issue**: *Tracking and Matching Payments*

The system must track payments and match them with invoices accurately. Delays in payment matching can cause revenue leakage or result in unnecessary payment follow-ups, straining customer relations.

**Partner Fulfillment Phase**

**Bottleneck**: *Complexity in Partner Coordination*

Third-party components may be fulfilled by Dell or sent directly from the partner to the customer, requiring Dell to keep track of different processes. This complexity can lead to errors in fulfilling complete orders or tracking partner responsibilities, especially if real-time visibility into partner processes is lacking.

**Issue**: *Payment and Contractual Agreement Variances*

Not all partners operate under the same contractual terms; some may require royalties, while others might have bespoke arrangements. If these terms are not standardized, it can lead to inconsistent costs and operational inefficiencies.

**Partner Invoice Phase**

**Bottleneck**: *Inconsistent Tracking Systems Across Partners*
Each partner may have unique methods and timing for invoicing, leading to discrepancies in tracking, reconciling, and processing partner invoices. This inconsistency requires extra resources to ensure accurate payments and prevents automated tracking of partner-related costs. This has adverse effects in regard to customer relations and when tracking fails Dell incurs cost.

**Partner/Royalty Payment Phase**

**Issue**: *Diverse Payment Methods*
Dell's need to accommodate various payment methods—such as royalties, blanket purchase orders, or ad-hoc payments—adds complexity to financial operations. This diversity necessitates customized financial processes, which can strain finance and accounting resources and increase the risk of errors in partner payments

This will be useful, as unmatched payments have previously occurred due to Dell's many acquisitions and staff turnover. Additionally, due to efficiency and a lack of traceability in correspondence between Dell and the Client, aspects such as quoting, sizing, and payment were never realized or took too long to be enacted. In addition, redundant tasks and manual data entry in quoting can create delays which could potentially increase errors. Streamlining these steps and consolidating roles will reduce error-prone areas, improving accuracy and minimizing the likelihood of mistakes in the critical stages highlighted above.

### *4.4 Target Process*

#### a) Business Process Improvement

Our proposed improvements address specific inefficiencies identified in Dell's current quoting, sizing, and payment processes. These challenges include delays in quoting due to manual data handling, errors in payment processing that complicate vendor relationships, and a lack of traceability in payment and quote records. Each improvement directly targets these issues.

The current process relies on manual tracking for quotes and payments, often resulting in misaligned records and delayed responses. To resolve this, the improved system consolidates all quote and payment data in a centralized database that automatically matches and records entries, ensuring data accuracy and faster response times. This enhancement reduces the administrative burden, provides reliable access to updated records, and delivers a more seamless experience for clients.

Manual payment processing has also led to frequent errors and delayed status tracking. By automating payment entries and confirmations, the system minimizes these issues, strengthens client relationships, and offers real-time payment status visibility. The system's automated notifications for new quotes and payment reminders further enhance transparency, enabling Dell to respond to client needs more effectively.

The current quoting workflow involves multiple physical handoffs between teams, which slows down the process and increases the risk of miscommunication. By restructuring the quoting process to include automated steps, Dell can minimize these handoffs and establish clear communication checkpoints, improving time management and efficiency for clients and ultimately strengthening their relationship with Dell.

Two separate paths are established for new partnerships and renewals. For new partnerships, once a quote is generated, it is logged in the system. When the partner accepts, the quoting team marks the quote as accepted, sending it to the payment team, which then issues an invoice. Upon receiving payment through the system, the payment team logs the transaction, noting the contract duration. In the renewal process, once a contract expires, the sizing team contacts the third-party vendor to discuss renewal. If the vendor agrees, they proceed to the quoting team to renew or create a new quote, followed by the payment process. If the vendor declines, or Dell decides to end the partnership, the process concludes.

This targeted approach to process improvement will ensure Dell meets the demands of a subscription-based model with greater efficiency, accuracy, and reliability in client and vendor interactions.

For further details on the target BPM, please refer to Appendix B2.

**b) Process Extension**

To expand on sizing opportunities, Dell will implement an application usage tool that tracks the types of software and applications Dell's clients frequently use. By analyzing this data, Dell's sizing team can identify third-party vendors whose offerings align with these client preferences. The team can then proactively reach out to these companies as potential vendors to establish partnerships with those that share the same product archetype. This tool will enable Dell to base sizing decisions on precise client preferences, facilitating a more tailored quoting process. By building partnerships with vendors that match Dell's clients' needs, Dell can improve accuracy and make sizing recommendations more relevant. This approach will not only enhance the quoting process but also strengthen Dell's vendor network, aligning closely with client interests and preferences.

### c) Analytics Capabilities

In order to enhance Dell's monitoring abilities and assess process improvements, our recommendations are implementing specific metrics and the below KPIs (key performance indicators) through quoting, sizing, and payment processes:

1. Quoting Time Generation: This will measure the efficiency from sizing to quote completion.
2. Quoting Rate of Acceptance: This will track the percentage of quotes that were accepted by the client.
3. Processing Time for Payment: This will measure the time that it would take for an invoice to be generated for the payment confirmation.
4. Vendor Rate of Acquisition: This will assess the success rate in securing a third-party vendor that is aligned with the client's preferences.

In addition, a central dashboard displaying these key performance indicators will enable Dell to track trends and address delays and issues, which will enhance client satisfaction.

# System Requirements

## 5. System Actors

### *5.1 Primary Actors*

1. **Client:** The client interacts with Dell's system to view quotes, make payments, and track statuses.
2. **Dell's Sales Team:** Responsible for sizing requirements, working with potential vendors and fulfillment.
3. **Dell's Payment Team:** Manages invoice generation, payment confirmations, and maintains payment records.
4. **Third-Party Vendor:** Potential partners whose products align with client needs.
5. **System Administrator:** Manages and oversees database operations.

### *5.2 Secondary Actors*

- **Quoting and Payment Tracking System:** Integrated digital systems used to manage and track quotes and payments within Dell's internal processes.

## 6. Functional Requirements

The proposed system is designed to streamline Dell Technologies quoting, sizing, and payment processes, enhancing efficiency, accuracy, and traceability across multiple business functions. The solution will serve Dell Technologies' internal teams (Quoting, Sizing, and Payment), clients, and third-party vendors, ensuring that each actor's interactions are consolidated and effectively managed through an integrated platform.

The **core functionalities** of the system include:

1. **Quoting and Sizing Automation**

    a. The system enables Dell's Quoting and Sizing Teams to generate, manage, and track quotes accurately and efficiently. By automating quote generation and consolidating quote records in a centralized database, the system minimizes manual errors, reduces physical handoffs, and allows each quote's status to be tracked in real-time. The Sizing Team will leverage an embedded application usage tracking tool to analyze client preferences, helping them identify and recommend compatible third-party vendors, thus aligning quotes with client needs more effectively.

2. **Payment Processing and Confirmation**

    a. The system will automate the payment process to ensure streamlined interactions between Dell's Payment Team and clients. When a client accepts a quote, an invoice will be automatically generated and sent to the client, who can then

process the payment through the platform. Once payment is received, the system will confirm and log the payment, updating both the client and relevant Dell teams on the payment status. Automated notifications will alert clients to outstanding payments or renewals, maintaining transparency and enhancing the client experience.

3. **Renewal Management**

    a. For partnership renewals, the system will notify the Sizing and Quoting Teams when a contract expires. This allows Dell's teams to proactively reach out to third-party vendors to discuss renewal options. If a partnership is renewed, the system initiates the quote generation and payment processes, ensuring seamless continuity. If a partnership is not renewed, the system closes the process, keeping internal records updated.

4. **Vendor Acquisition and Relationship Management**

    a. The system incorporates vendor relationship management functionality, allowing Dell's teams to identify and approach third-party vendors based on data insights. By analyzing client application usage, Dell can establish partnerships with vendors whose offerings align closely with client preferences, thus strengthening the vendor network and improving Dell's market alignment.

5. **Real-time Data Access and KPI Tracking**

    a. A centralized dashboard provides real-time data access for key performance indicators (KPIs) to help Dell monitor process efficiency and client satisfaction. KPIs such as Quote Generation Time, Quote Acceptance Rate, Payment Processing Time, and Vendor Acquisition Success Rate will be tracked, allowing Dell to identify trends and respond quickly to inefficiencies. This capability enhances Dell's decision-making and operational visibility.

## 7. Non-Functional Requirements

The non-functional requirements focus on usability, security, and performance standards to ensure that the system meets Dell Technologies' operational needs and quality standards.

### 7.1 Look and Feel Requirements

The system's interface should follow Dell's design guidelines to create a familiar experience for users. This includes using the same colors, fonts, and overall style as Dell's existing products.

***Evaluation Metric:*** Conduct a UI conformity check using a checklist to verify consistency with Dell's design guidelines.

***Client Confirmation:*** Ensure that maintaining a familiar look aligns with Dell's user experience goals.

### 7.2 Usability Requirements

***Easy Navigation**:* Users should easily navigate the system. Key actions, like managing subscriptions and updating accounts, should be accessible in three clicks or less to improve user experience.

***Evaluation Metric**:* Measure the number of clicks from the main dashboard to complete key actions. Track user feedback on navigation ease.

***Client Confirmation**:* Validate that the three-click rule is acceptable and aligned with Dell's usability objectives.

**Accessibility Standards**: The system must meet WCAG 2.1 AA standards to ensure it is usable by all employees, including those with disabilities.

***Evaluation Metric**:* Conduct accessibility audits and tests using tools to ensure compliance with WCAG 2.1 AA.

***Client Confirmation**:* Confirm that accessibility standards are a priority for Dell.

### 7.3 Performance Requirements

***Scalability**:* The system should effectively handle more users and data as Dell moves more clients to its subscription model without slowing down.

- ***Evaluation Metric***: Perform load testing to ensure the system can handle increased user traffic without performance degradation.

***Client Confirmation**:* Discuss user growth projections with Dell to confirm scalability requirements.

- ***Fast Response Time**:* Essential functions, like subscription management and billing, should be completed in under 3 seconds during normal use.
- ***Evaluation Metric**:* Monitor and log response times for key functions, aiming for under 3 seconds.
- ***Client Confirmation**:* Validate that fast response times are essential for Dell’s operations.

### 7.4 Operational Requirements

***Supported Environments**:* The system should operate smoothly on Dell’s standard environments, including Windows and Linux servers, and be compatible with major browsers such as Chrome, Edge, and Firefox.

- ***Evaluation Metric**:* Conduct compatibility tests across specified operating systems and browsers.
- ***Client Confirmation**:* Ensure that the listed environments and browsers meet Dell's operational standards.

***Maintenance and Downtime**:* Scheduled maintenance should occur during off-peak hours, with unplanned downtime limited to a maximum of two hours monthly. Maintenance schedules should be shared with the operations team in advance.

- ***Evaluation Metric**:* Track downtime incidents to ensure compliance with maintenance guidelines.
- ***Client Confirmation**:* Verify that the maintenance schedule aligns with Dell's operational needs.

### 7.5 Maintainability and Portability Requirements

***Modular Design**:* The system should have a modular design for easy updates, allowing components to be changed with minimal disruption.

- ***Evaluation Metric**:* Assess system updates for modularity and measure disruption levels during updates.
- ***Client Confirmation**:* Confirm that modularity is essential for Dell's update practices.

***Comprehensive Documentation**:* Documentation should cover system configuration, integration points, and troubleshooting to help Dell's IT team manage and support it effectively.

- ***Evaluation Metric**:* Review documentation completeness and usability through feedback from Dell's IT team.
- ***Client Confirmation**:* Ensure documentation meets Dell's IT support requirements.

### 7.6 Security Requirements

***Data Security:*** The system must meet Dell's data protection standards, including encrypting sensitive information both at rest and in transit. Access should be role-based, allowing only authorized users to view data.

- ***Evaluation Metric:*** Conduct security audits to verify encryption and access control effectiveness.
- ***Client Confirmation:*** Validate that data security measures align with Dell's policies.

***Industry Compliance:*** The system should comply with SOC 2 and ISO 27001 standards, along with any other relevant regulations in Dell's operational regions.

- ***Evaluation Metric:*** Schedule compliance audits to assess adherence to SOC 2 and ISO 27001.
- ***Client Confirmation:*** Confirm compliance with relevant industry standards is a requirement for Dell.

### 7.7 Cultural and Political Requirements

***Multilingual Capability**:* To support Dell's global users, the system should initially offer options for English, Spanish, and Mandarin, with the ability to add more languages later.

- **Evaluation Metric**: Test multilingual functionality for initial languages and assess ease of adding additional languages.
- **Client Confirmation**: Verify that the initial language offerings meet Dell's global user needs.

### 7.8 Legal Requirements

***Data Privacy Compliance**:* The system must adhere to data privacy laws applicable to Dell, such as GDPR for EU customers and CCPA for California residents, ensuring secure handling and storage of personal data.

- ***Evaluation Metric**:* Conduct compliance audits to ensure adherence to GDPR, CCPA, and other relevant laws.
- ***Client Confirmation**:* Validate that compliance with data privacy laws is critical for Dell's operations.

## 8. Mandated Constraints

The following are the mandated constraints set by Dell Technologies for the system:

- ***Platform Compatibility:*** The system must be compatible with Dell's existing technical infrastructure and operational systems to ensure seamless integration and functionality.
- ***Data Privacy and Legal Compliance:*** The system must comply with all applicable data privacy regulations, such as GDPR and CCPA, and meet Dell's standards for secure data handling. This includes secure storage, processing, and access controls for all customer data.

## 9. Relevant Facts and Assumptions

### *9.1 Facts*

***Global Support Needs:*** Dell operates globally, so the system must support multiple languages and accommodate users with varying technical abilities.

***Subscription-Based Model:*** Dell is transitioning to a subscription-based model, requiring the system to handle recurring payments and monitor subscription statuses accurately.

***Extensive Client and Partner Network:*** Dell's vast network of clients and partners necessitates a system capable of managing multiple agreements and service-level commitments reliably.

## 9.2 **Assumptions**

***Integration Feasibility with Partners:*** It is assumed that the system can be made compatible with the processes of Dell's partners, despite limited knowledge of each partner's unique requirements.

***Modular Scalability:*** The system is assumed to be designed in a modular way that supports future scaling as Dell's subscription services grow.

## 10. Data Requirements

**Data Model Narrative for Dell's Business System**

Dell's business data model encapsulates various entities that represent core operational processes and relationships with clients, vendors, and product offerings. Below is a detailed narrative describing the purpose and relationships of these entities:

**1. Quotes (PK: QuoteID):**

This entity captures the quotes provided to clients for Dell's products and services. Each quote is uniquely identified by a *QuoteID* and represents the estimated cost and details of the offerings presented to a client. Quotes serve as the initial stage of the client engagement process, often preceding orders. This table also includes the quote amount and the client it represents.

**2.Quote Details**

The QuoteDetails entity is central to the data model. It holds unique information about each quote, including the client and vendors involved, the amount, and the date the quote was issued. It also identifies the associated order, and the products included in the order. This information allows Dell to determine whether the quote has been paid.

**3. Clients (PK: ClientID):**

The Clients entity represents the individuals, organizations, or institutions that have purchased products or services from Dell. Each client is uniquely identified by a ClientID. This table allows Dell to maintain records of client interactions, purchases, and associated details. It also records the *ClientName, ClientAddress, ClientEmail*, and *PaymentID*, which serves as a foreign key, as well as the orders placed by the client, represented by *OrderID* (FK).

**4. Vendors (PK: VendorID):**

This entity captures information about Dell's third-party partners, uniquely identified by a *VendorID*. Vendors supply additional products, services, or support that complement Dell's offerings. This relationship ensures a broader portfolio and enhanced client solutions. The table also includes *VendorDescription* and *VendorContact* information.

**5. Invoices (PK:InvoiceID):**

This table stores all payment-related information for transactions that Dell expects from its clients. Each payment is uniquely identified by a *PaymentID* and includes details such as the amount, associated client (ClientID [FK]), payment date, payment amount, status (*StatusID* [FK]), and payment method.

**6. VendorPayments(VendorPaymentID)**

The *VendorPayments* table records payments that Dell owes to its partners, particularly vendors. This ensures proper tracking of outstanding obligations in vendor relationships, helping Dell

maintain financial health and vendor trust. This table holds the foreign keys *VendorID* and *PaymentID*, and additionally includes information about the due date, amount due, and payment method.

**7.Orders (PK: OrderID):**

The Orders table represents confirmed purchases made by clients. Each order is uniquely identified by an *OrderID* and is linked to clients and the products or services purchased. It acts as the central entity for managing transactions. ClientID (FK) links the order to the client who made the purchase. Additional fields include *OrderDate, OrderStatus, OrderAmount*, and *ProductID* (FK), which identifies the products in the order.

**8. Product (PK: ProductID):**

This entity houses information about the products Dell offers. Each product is uniquely identified by a *ProductID*. The table includes essential details such as specifications, pricing, and associated categories, serving as the backbone for inventory and client purchase tracking. It also includes *ProductTypeID and ProductDetails*, as well as information about the vendor supplying the product, linked through *VendorID*.

**9. PaymentStatus (PK: StatusID):**

This lookup table defines the various statuses a payment can have, such as "Pending," "Completed," "Overdue," or "Canceled." The *StatusID* allows consistent tracking and reporting of payment progress. It also includes *StatusDescription*.

**10. ClientType (PK: ClientTypeID):**

The *ClientType* table categorizes clients based on their nature or sector, such as government, defense, private enterprises, or educational institutions. *ClientTypeID* enables Dell to tailor offerings and strategies for different client categories. The table also includes *ClientTypeDescription.*

**11. ProductType (PK: ProductTypeID):**

This lookup table categorizes Dell's products into types such as hardware, software, peripherals, or services. *ProductTypeID* supports structured inventory and marketing strategies. It also includes *ProductTypeDescription*.

**12.Payment (PK: PaymentID):**

The Payment table defines the various methods of payment Dell and its vendors use. Examples include wire transfers, credit card payments, or purchase orders. *PaymentTypeID* ensures flexibility and clarity in financial transactions. The table also includes *PaymentTypeDescription*.

**Entity Relationships:**

**Clients and Quotes:** A client can have multiple quotes, and each quote belongs to a single client.

**Clients and Orders:** A client can have multiple orders, but each order can only be associated with one client.

**QuoteDetails and Quotes:** Each QuoteDetail can only be associated with one quote, but a quote can have many details.

**Clients and Payments:** A client can have multiple payments, but each payment can only be associated with one client.

**Products and Vendors:** Each vendor can supply many products that they license to Dell, but each product can only have one associated vendor.

**QuoteDetails and Vendors:** Each QuoteDetail can only reference one vendor, but vendors can be associated with many quotes.

**Orders and Products:** One order can include many products, and a product can appear in many orders. To resolve this many-to-many relationship, the OrderDetails table is used to represent the association.

**Payments and Payment Status:** Each payment can only have one status, and each status highlights only one payment.

**Payments and Quotes:** Each individual quote can only be paid once.

**Products and Product Types:** Each product can belong to only one type, but there can be many products of a certain type.

**Clients and Client Types:** A client can only belong to one type, but there can be many clients within a given type.

**Vendors and Products:** Each product has a specific vendor, but a vendor can supply many products.

The data model provides a comprehensive representation of all of the data objects managed by the system and their inter-relationships. Each box in the diagram represents a specific data entity while the connections between them illustrate how these entities interact. This model supports the system's functionality by ensuring data is structured and accessible to meet operational and reporting requirements. For instance, the relationship between Quotes, Orders, and Payments highlights how client transactions flow through the system, enabling efficient tracking and management. For More information look at Appendix F

## Appendix A (Glossary)

***Application Usage Tool:*** A tracking tool that monitors the software and applications frequently used by Dell's clients, enabling Dell to identify potential vendor partnerships aligned with client needs.

***Baseline Process***: The initial, existing process at Dell before any improvements or automation, serving as a reference point for the target process.

***Bill of Materials (BOM)****:* A detailed list of items, parts, or components required for a particular product or solution provided by Dell to its clients.

***Centralized Database***: A unified system for storing all transaction data, including quotes, payments, and vendor interactions, ensuring accurate tracking and real-time access for Dell teams.

***Client****:* Refers to businesses or organizations that purchase Dell's products or services, specifically within the subscription model context.

***ERP (Enterprise Resource Planning)****:* A type of software used by organizations to manage daily business activities, such as accounting, procurement, project management, and supply chain operations, with which Dell's new system must integrate.

***KPI (Key Performance Indicator)***: A measurable value used to assess effectiveness in Dell's quoting, payment, and partnership processes.

***Partner Compensation***: Process of compensating third-party vendors for services resold to Dell clients, such as royalties' transactions and other payment methods.

***Quoting System***: Automated system used to generate quotes, calculate prices, and manage payments. This provides real-time pricing and reduces manual work.

***Renewal Process***: The workflow followed when an existing partnership or client contract is up for renewal, ensuring continuity or managing contract conclusion with third-party vendors.

***Sizing***: The process of determining the customer's product requirements and configuring solutions according to them. This is part of the initial sales phase process.

***Subscription Model***: A business model where the customers can pay on a recurring basis instead of a one-time payment.

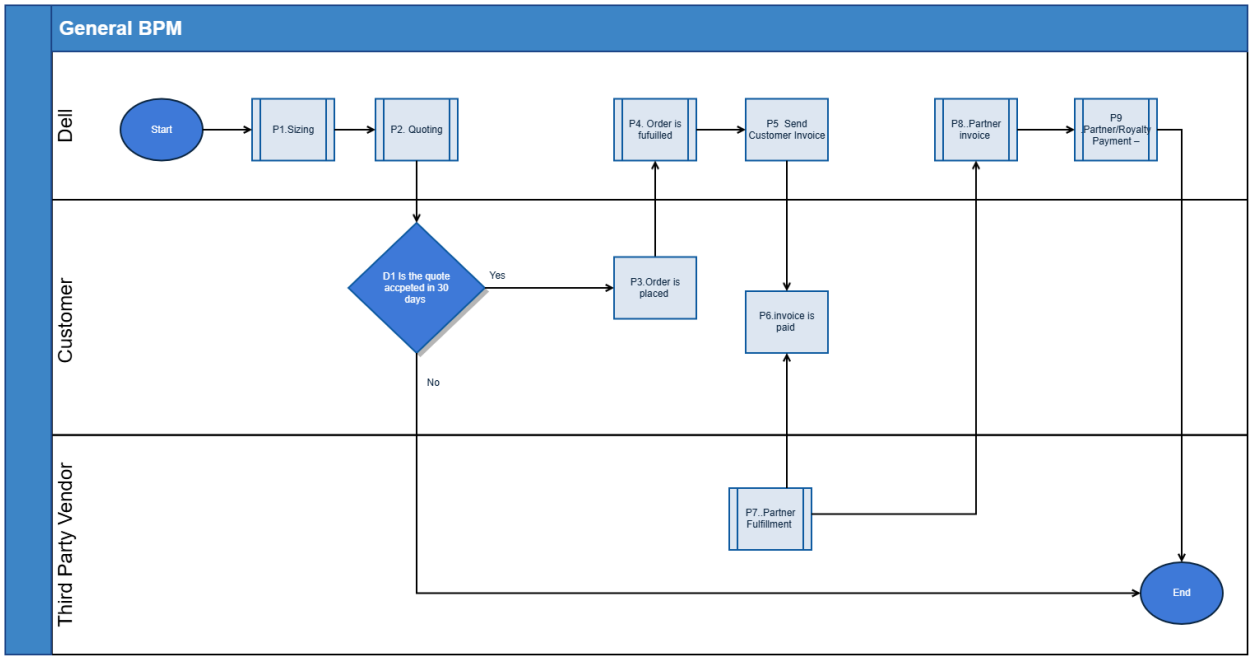
***Target Process****:* The improved and optimized process model aimed at increasing efficiency, accuracy, and traceability for Dell's subscription-based offerings.

***Third-Party Vendor***: External service provider whose products are sold alongside Dells', requiring integration and compensation through Dell's system.

***Traceability***: The process that allows us to track the status of payments, quotes, and communications, reducing errors and improving transparency between Dell and its clients.

# Appendix B1

## General BPM

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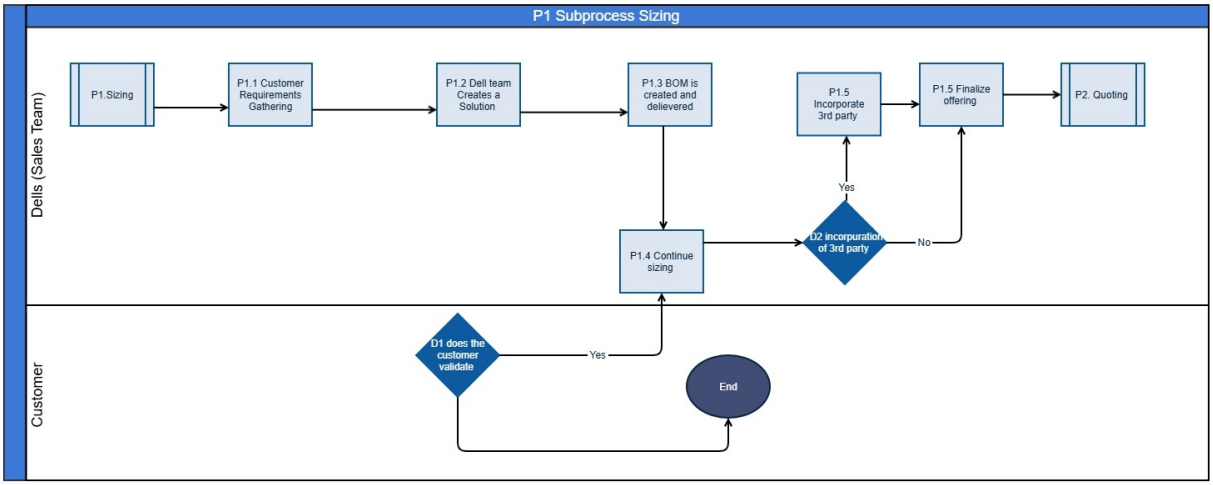
## P1. Subprocess Sizing BPM

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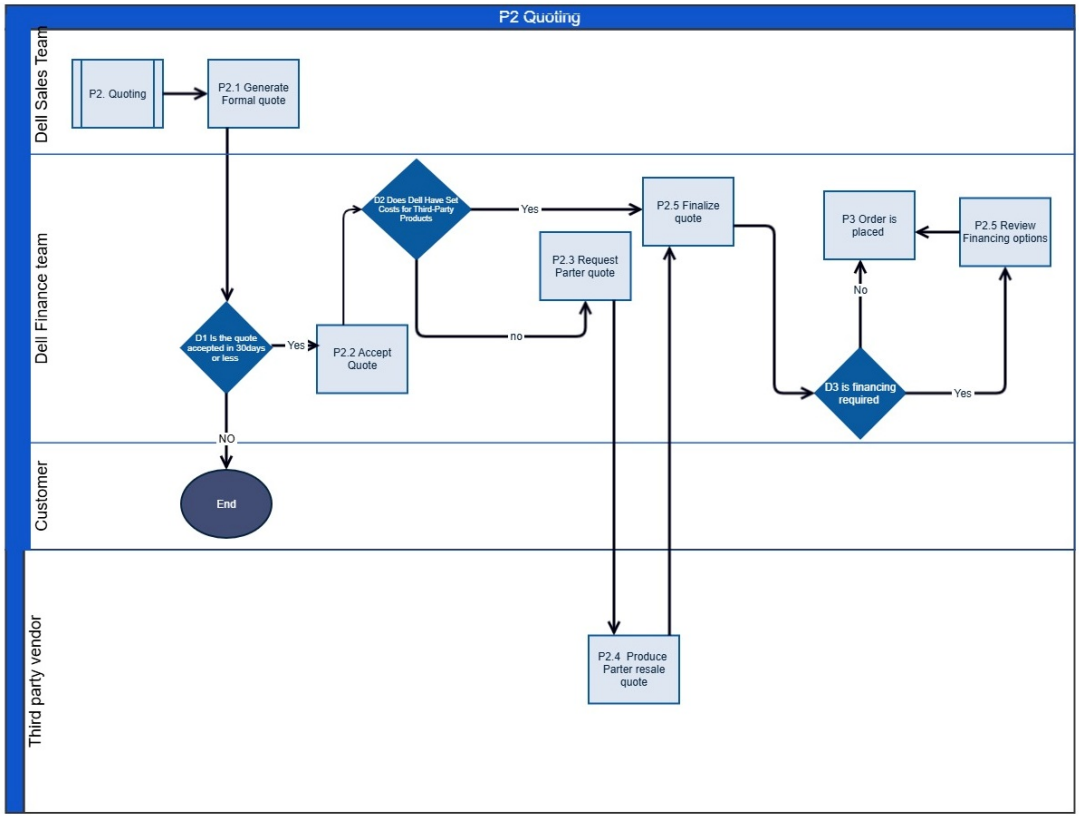
## P2. Quoting Subprocess

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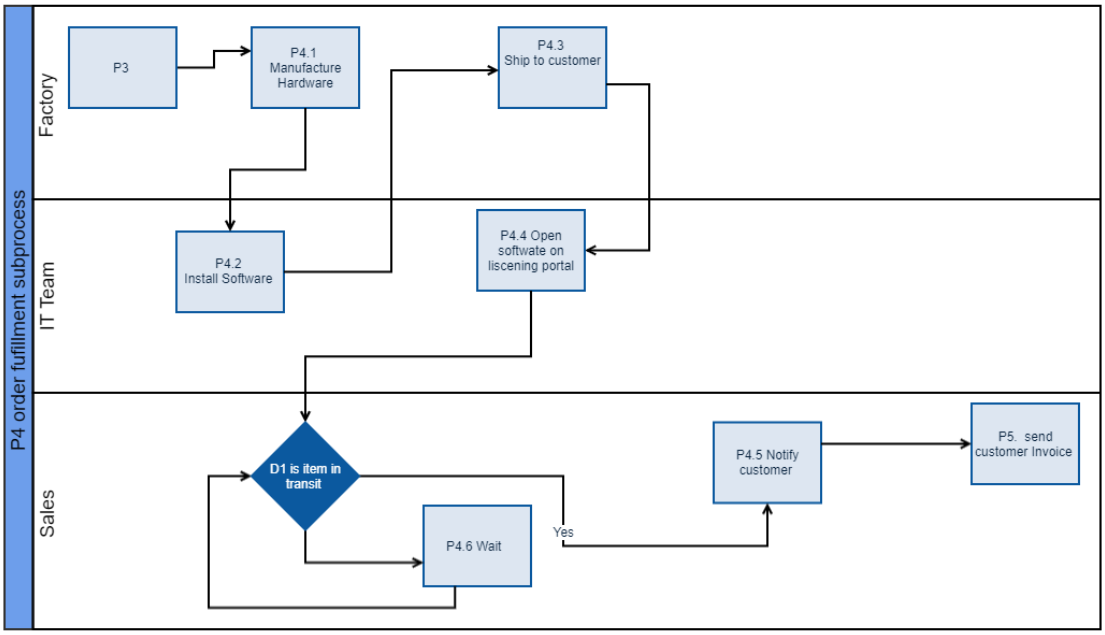
## P4. Order Fulfillment Subprocess

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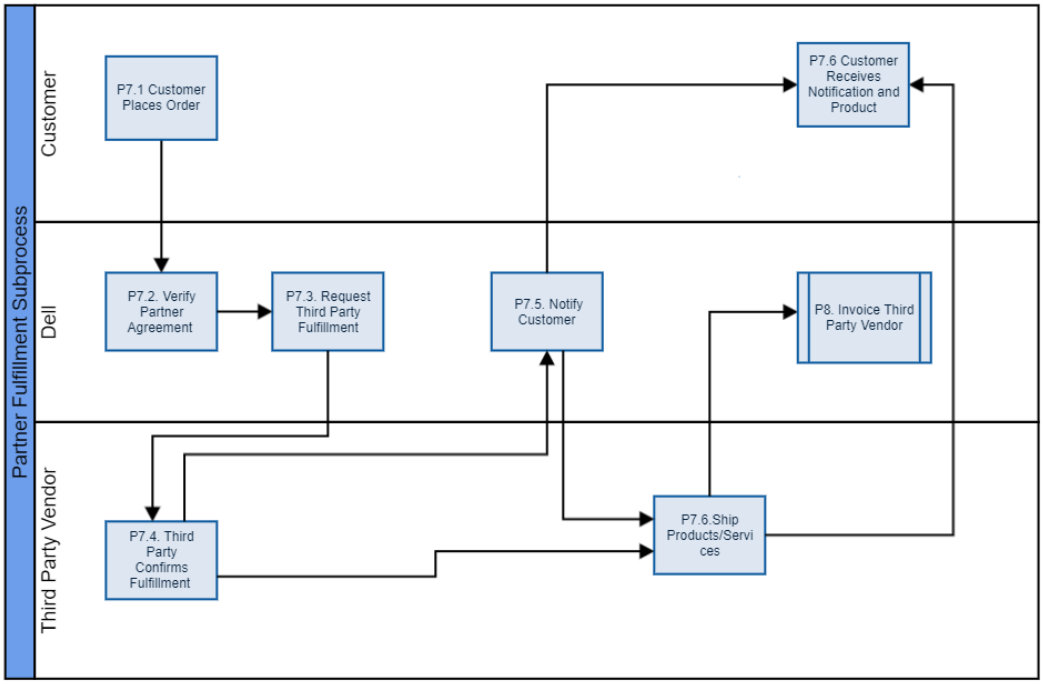
## P7. Partner Fulfillment Subprocess

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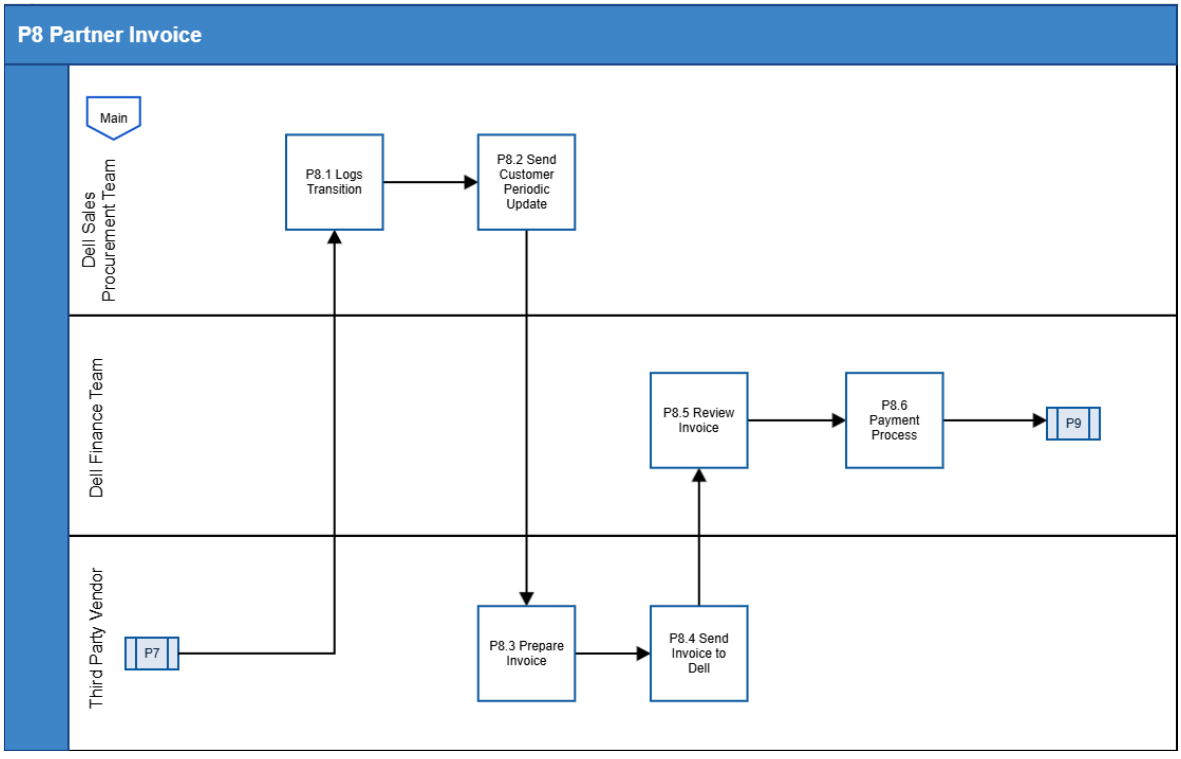
## P8. Partner Invoice

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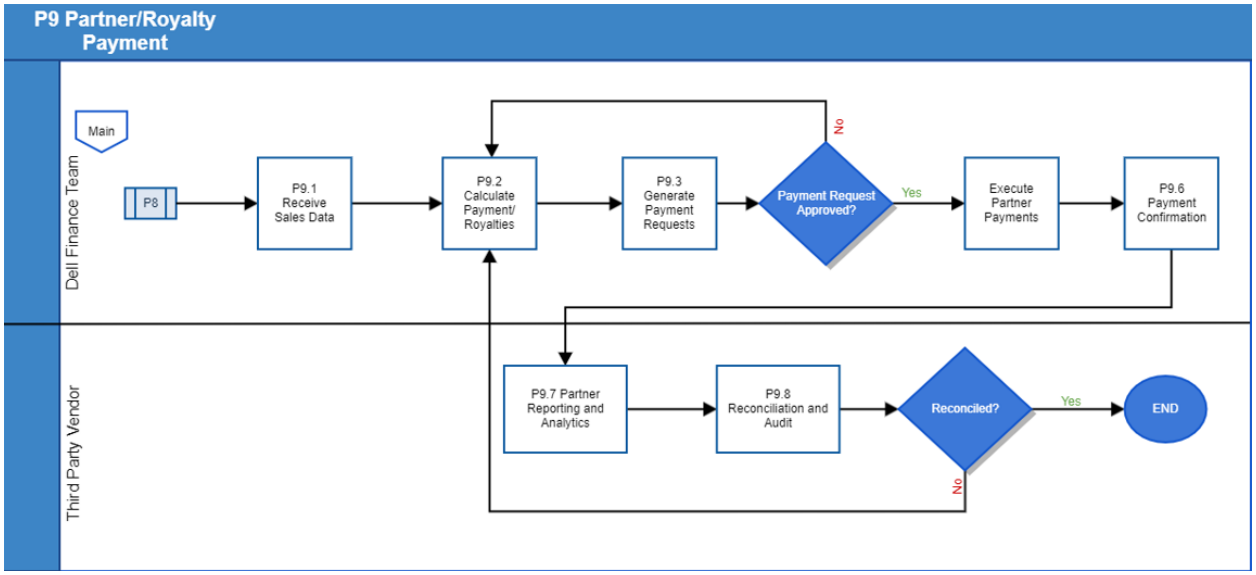
## P9. Partner Payment

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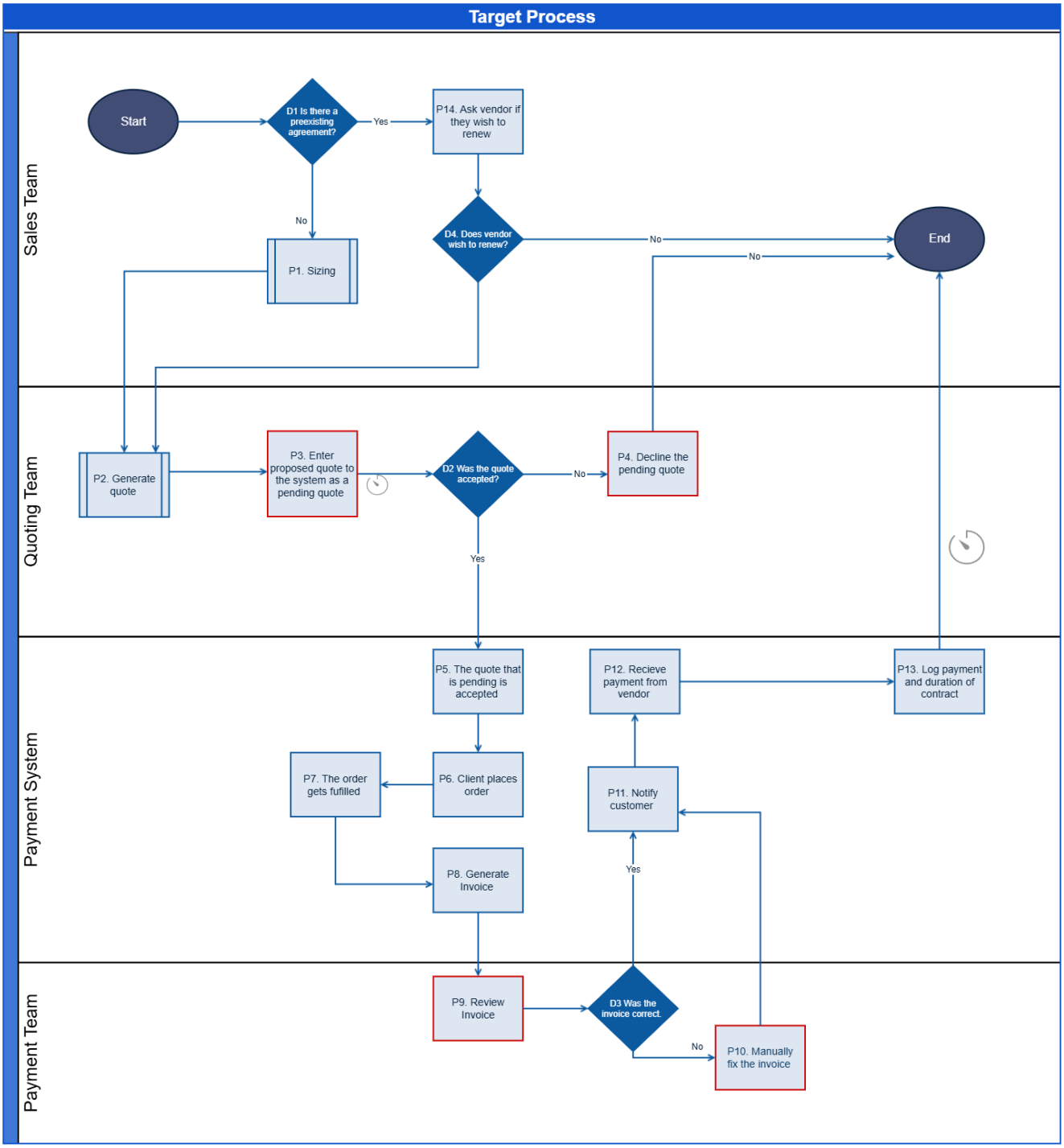
## Appendix B2




*Steps outlined in red are implemented manually

## Appendix C

| *Actor Specification Card* | |
|---|---|
| **Actor Name:** Client | |
| **Type:** Primary | **Kind:** Manual Human |
| **Role Description:** The client is a business partner who interacts with Dell's system to review quotes, make payments, and track order statuses. | |
| **Actor Goals:**<br>• Access and review quotes.<br>• Make payments and track payment status.<br>• Receive notifications for renewals or outstanding payments. | |

| *Actor Specification Card* | |
|---|---|
| **Actor Name:** Sales Team | |
| **Type:** Primary | **Kind:** Manual Human |
| **Role Description:** This team is responsible for understanding client needs, tracking application usage, and identifying suitable third-party vendors to improve the quoting process. | |
| **Actor Goals:**<br>• Track client application usage for better vendor alignment.<br>• Identify and recommend third-party vendors that match client preferences.<br>• Coordinate with the Quoting Team to ensure accurate sizing. | |

| *Actor Specification Card* | |
|---|---|
| **Actor Name:** Payment Team | |
| **Type:** Primary | **Kind:** Manual Human |
| **Role Description:** The Payment Team manages invoice generation, payment confirmations, and keeps an updated log of all payments received. | |
| **Actor Goals:**<br>• Generate invoices based on quotes accepted by clients.<br>• Confirm payments and update records.<br>• Notify clients and other relevant teams when payments are processed. | |

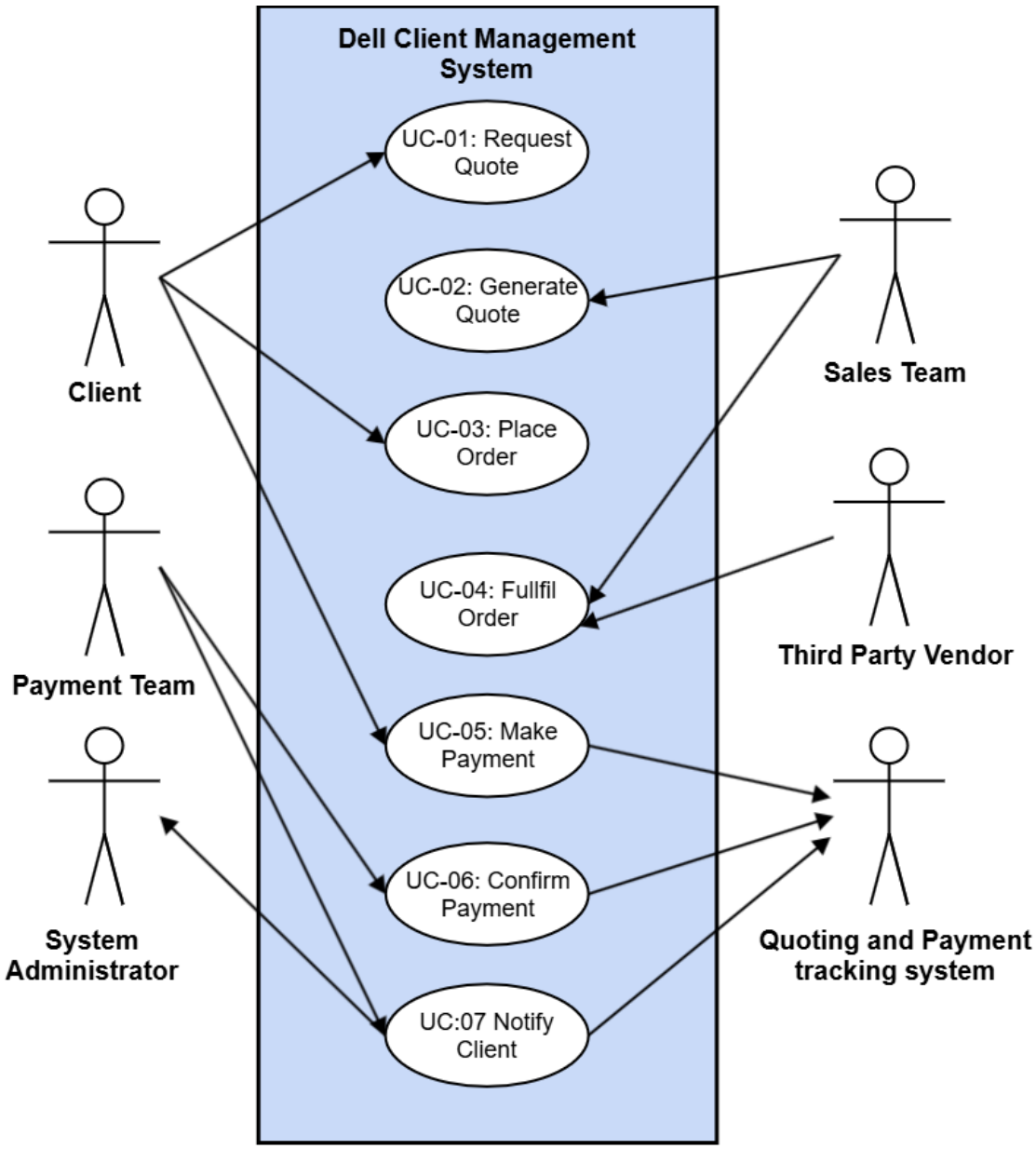
| *Actor Specification Card* | |
|---|---|
| **Actor Name:** Third-Party Vendor | |
| **Type:** Secondary | **Kind:** Manual Human |
| **Role Description:** A third-party vendor is a potential partner whose products or services align with client preferences. They collaborate with Dell to provide offerings that match client needs. | |
| **Actor Goals:**<br>• Provide products or services required for client orders.<br>• Collaborate with Dell to ensure seamless order fulfillment. | |

| *Actor Specification Card* | |
|---|---|
| **Actor Name:** System Administrator | |
| **Type:** Secondary | **Kind:** Manual Human |
| **Role Description:** The System Administrator manages and oversees the system's database operations to ensure smooth functionality and data integrity. | |
| **Actor Goals:**<br>• Manage and maintain the system database. | |

### 5.2 Secondary Actors

| **Actor Name:** Quoting and Payment Tracking System | |
|---|---|
| **Type:** Secondary | **Kind:** Automated System |
| **Role Description:** This actor represents the integrated digital systems used to manage and track quotes and payments within Dell's internal processes. These systems enable real-time updates, automated entry and confirmation of payments, and provide the quoting and payment teams with an efficient way to store and retrieve transaction data. They facilitate automated client notifications and help ensure that records are accurate and accessible for all teams involved in quoting and payment workflows. | |

## Appendix D

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## Appendix E

| Use Case | UC-01: Request Quote |
|---|---|
| Elaboration Phase | Initial |
| System Actors | Client (H) |
| Business Process Steps/Decisions | P1, P2 |
| Business Process Description | The client initiates the process by requesting a quote for products or services. |
| System Use Case Description | • This use case ensures that client specifications are captured and forwarded accurately to initiate the quoting process. |

| Use Case | UC-02: Generate Quote |
|---|---|
| Elaboration Phase | Initial |
| System Actors | Sales Team (H)<br>Quoting and Payment Tracking System (S) |
| Business Process Steps/Decisions | P2, P3, D2 |
| Business Process Description | The sales team uses the system to generate a customized quote for the client. |
| System Use Case Description | • Streamlines quote generation by integrating client needs and system tools. |

| Use Case | UC-03: Place Order |
|---|---|
| Elaboration Phase | Initial |
| System Actors | Client (H) |
| Business Process Steps/Decisions | P5, P6 |
| Business Process Description | The client reviews and confirms the quote to place an order. |
| System Use Case Description | • The client logs into the system and navigates to the "Quotes" section.<br>• The client reviews the received quote, including item details, pricing, and terms.<br>• The client confirms the quote and selects the payment method (e.g., credit card, bank transfer).<br>• The system validates the payment method and confirms order submission.<br>• A unique order ID is generated, and an order confirmation is sent to the client. |

| Use Case | UC-04: Fulfill Order |
|---|---|
| Elaboration Phase | Initial |
| System Actors | Dell's Sales Team<br>Third-Party Vendor |
| Business Process Steps/Decisions | P7, P12, P13 |
| Business Process Description | The sales team collaborates with vendors to fulfill the client's order. |
| System Use Case Description | • The sales team assigns the order to a vendor based on product availability and location.<br>• The vendor receives the order details and prepares for fulfillment.<br>• The vendor ships the order and updates the system with delivery details.<br>• The system notifies the client about the shipping status.<br>• Ensures smooth coordination between Dell's team and vendors for timely delivery. |

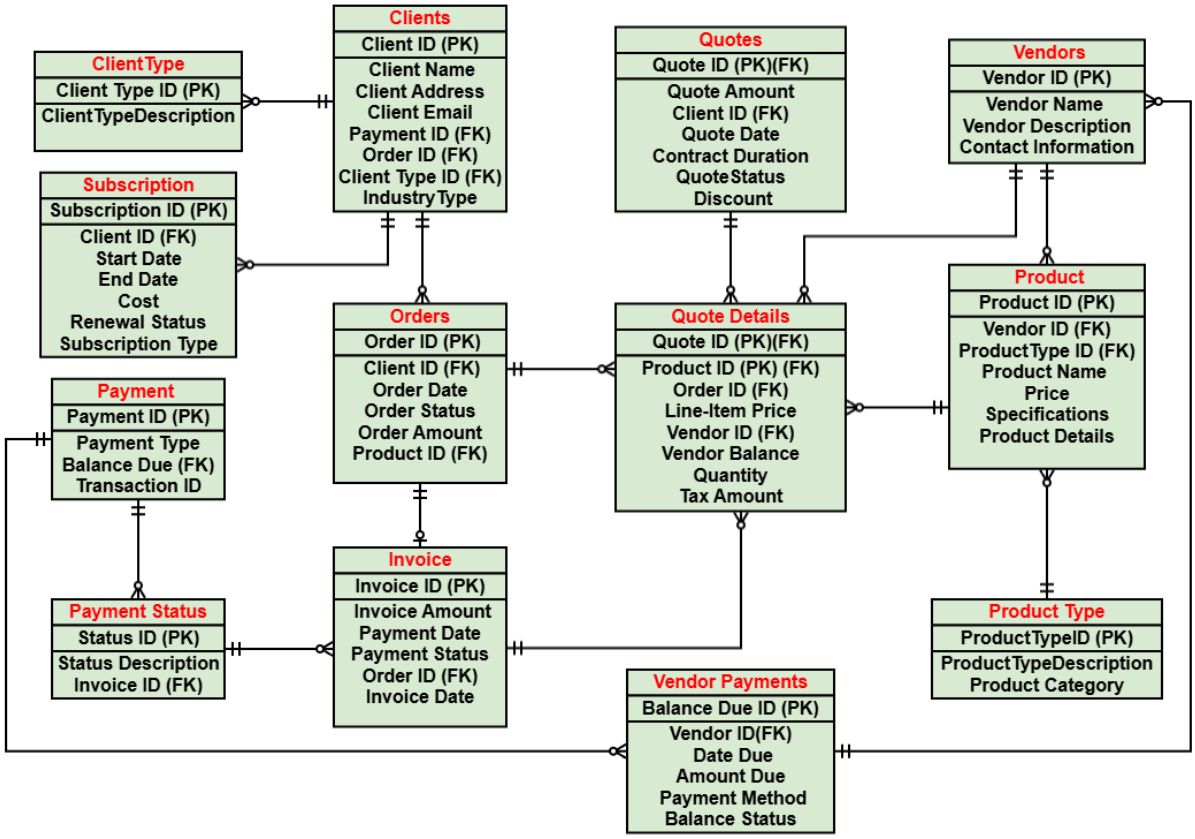
| Use Case | UC-05: Make Payment |
|---|---|
| Elaboration Phase | Initial |
| System Actors | Client<br>Dell's Payment Team<br>Quoting and Payment Tracking System |
| Business Process Steps/Decisions | P8, P9, P10, P11, P12 |
| Business Process Description | The client makes payment, and the system records it for processing. |
| System Use Case Description | • The client selects the "Make Payment" option in the system.<br>• The system validates the payment details.<br>• Payment is processed, and the system generates a receipt.<br>• The payment team verifies the transaction.<br>• Facilitates secure and efficient payment processing. |

| Use Case | UC-06: Confirm Payment |
|---|---|
| Elaboration Phase | Initial |
| System Actors | Payment Team<br>System Administrator<br>Quoting and Payment Tracking System |
| Business Process Steps/Decisions | D3, P9, P10, P13 |
| Business Process Description | Confirms the payment and updates payment records. |
| System Use Case Description | • The system sends a payment notification to the Payment Team.<br>• The team verifies the payment and updates the system<br>• Ensures payment confirmation and accurate record maintenance. |

| Use Case | UC-07: Notify Client |
|---|---|
| Elaboration Phase | Initial |
| System Actors | System Administrator<br>Quoting and Payment Tracking System |
| Business Process Steps/Decisions | P11, P13 |
| Business Process Description | Keeps the client informed about order and payment statuses. |
| System Use Case Description | • The system tracks updates in order/payment statuses.<br>• Sends notifications to the client via email and portal.<br>• Provide timely updates to enhance the client experience. |

# Appendix F

## Data Model



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