

I. Functional Requirements

A. Business Requirements:

1. User-friendly dashboard and real-time metrics on risk factors.
2. Identify possible supply chain risks by allowing the user to visualize supplier locations.
3. Identify potential supply chain risks by enabling the user to visualize supply routes.
4. Identify potential supply chain risks by enabling the user to visualize supply manufacturing locations.
5. Ability to integrate with and display information about quality control applications for the supplier, consumer, and intermediary.
6. Ability to integrate with and display information about logistics intelligence for the supplier, consumer, and intermediary.
7. Ability to integrate with and display information about satellite imagery for the supplier, consumer, and intermediary.
8. A web application dashboard shows real-time risk-related information on suppliers.
9. A web application correlating geolocation with physical addresses to ensure proper shipment and delivery.
10. A web application uses integrated maps to display dynamically optimized transportation routes that reduce the risk to deliveries caused by natural hazards or possible malicious acts.
11. Integration with cyber threat-related feeds for supply chain risk management.
12. Ability to share data with trading partners.

B. Data Requirements

1. Ability to integrate with Google Maps to track assets:
 - i. Manufacturing
 - ii. Locations
 - iii. Routes
 - iv. Suppliers
 - v. Shipments
2. The web application dashboard must display data for:
 - i. Manufacturing
 - ii. GPS
 - iii. Tracking
 - iv. Packaging
 - v. Shipping and receiving

C. Timing Requirements

1. Latency: No more than five-second response time on any task of the interface.
2. Must be accessible to users regardless of their physical location.

Requirements Artifacts

Contoso Inc.

30-March-2020

3. Must always be available, allowing the customer to know what their supply chain looks like at any given point in time.
4. Frequency: Upgrade 6 months.
5. Duration: Data shall be archived for twenty years.

II. Non-Functional Requirements (NFRs)

NFR	Scope	Evaluation Criteria
Compliance	<ul style="list-style-type: none"> • FedRAMP • DFARS • DoD impact level 5 • ITAR certification for suppliers 	<ul style="list-style-type: none"> • Assessment, authorization, and monitoring for cloud services meet FedRAMP requirements. • Raw material purchasing must be compliant with DFARS. • Meet criteria for DOD impact level 5. • Each supplier will show proper ITAR policy and provisions and certification.
Interoperability	<ul style="list-style-type: none"> • The system will pull data from external databases and use machine learning and data mining within the fusion engine to deliver risk-related information to Tracker Analytics. • Integration with quality control applications, logistics intelligence, and satellite imagery. 	<ul style="list-style-type: none"> • Accurate time-stamped information about manufacturing data, weather data, GPS data, tracking data, packaging data, shipping data, and receiving data. • Successful integration of quality control, logistics, and satellite imagery.
Performance	<ul style="list-style-type: none"> • Minimizing transaction response time to five seconds or less, including user input, data storage, data processing, formatting of output, transmission, and final display. • Restful API ensures data is accessible when requested. 	<ul style="list-style-type: none"> • Five second response time • High throughput • Availability • High bandwidth • Short data transmission time
Reliability	<ul style="list-style-type: none"> • The system must be operational 24 hours a day, 365 days a year. • Acquired information must be accurate, and information must be consistent. 	<ul style="list-style-type: none"> • Easy deployment. • Cost-effective recovery process that allows the system to work even during outages. • Site Recovery is a native Disaster Recovery as a Service (DRaaS).
Security	<ul style="list-style-type: none"> • The system provides data confidentiality, integrity, and availability. • The system will use a secure government cloud and web-based application. • Azure Active Directory.Seamless Sigle Sign-on. • Multi-factor Authentication. 	<ul style="list-style-type: none"> • Resiliency against unauthorized access or misuse of data. • Protect data from alteration • Uninterrupted access to the system.

III. Installation Requirements

1. Higher modularity of cloud-infrastructure services with faster interconnects

The low-latency requirement of no more than 5 seconds per transaction of all requests means that much more bandwidth and resources must be allocated for dynamic and real-time database queries, integrations, and map dashboard display. Moreover, this requirement involves a cloud-based high-performance infrastructure. This cloud infrastructure brings stream processes modularized for rapid and reliable response during peak times (i.e., Azure Functions, Event Hubs, database servers, application and web servers, etc. that are fault-tolerant under heavy load). Hence, the installation requirements now entail a Microsoft Azure Government Cloud subscription, 3rd party RESTful APIs integrations, machine learning, and artificial intelligence technologies.

2. Google Map Services integration

A secure web-based interactive Google Map for tracking locations, routes, suppliers, and shipments in a Single Pane of Glass (SPoG). Google map services are the critical feeder for this integration with Tracker Analytics software using API integration. This installation requirement relies on the availability and accuracy of Google map services to report on tracking locations and routes, as well as Fusion engine integrations to other database engines to report on suppliers and shipment inventory and information to update the map dashboard as the SPoG for the end-user.

3. Encryption and authentication integrations

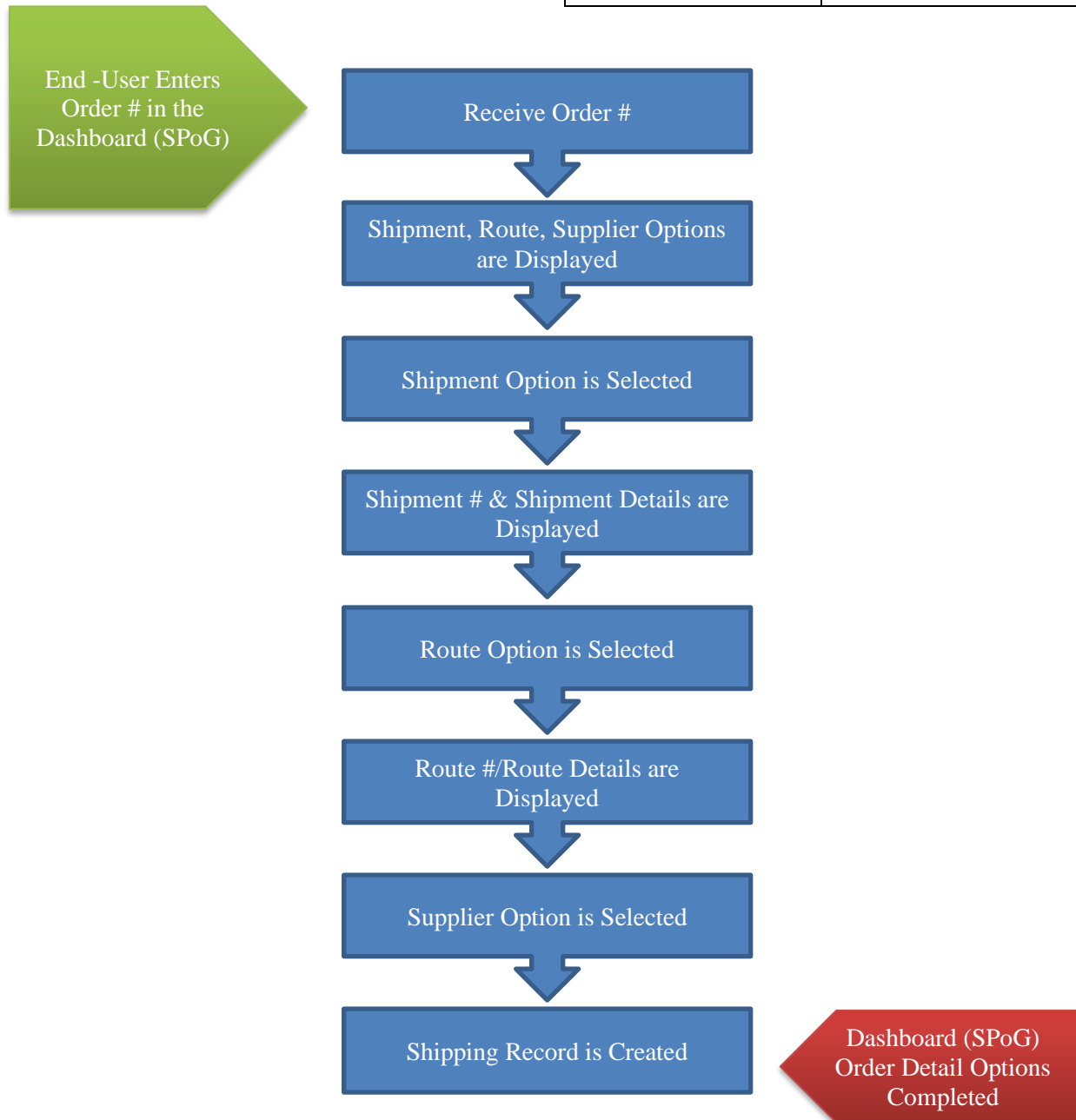
Encryption requirements for data upon transmission and storage means that only appropriate secure protocols must be implemented. Additionally, authentication and authorization must use modern standards (SAML 2.0, OAuth, etc.). Secure RESTful APIs are used to perform integrations with Tracker Analytics software and secrets management infrastructure to secure connectivity to other intelligent databases. Microsoft Azure Active Directory authentication with Single-Sign-On and multi-factor authentication are used to authenticate users into the portal securely. Hence, the installation requirements must now take account of encryption and authentication configurations needed to secure the cloud environment from bad actors.

4. Interfacing with modern browsers and terminals

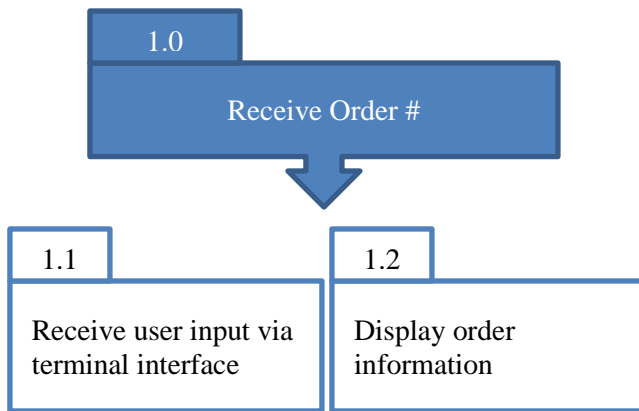
Modern web browser and Intuitive User Interface (UI) with a granular level of functionality is required to meet many of the NFRs of the requested system. Manufacturing and government personnel demand a standard approved UI that is utilized in the common workplace. Acceptable internet and network connectivity play critical roles in a satisfactory use case, so the installation requirements must meet those needs as well.

IV. Operational Reference Model (ORM)

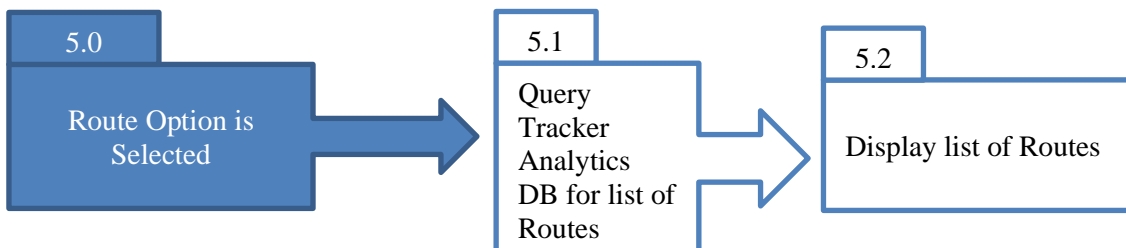
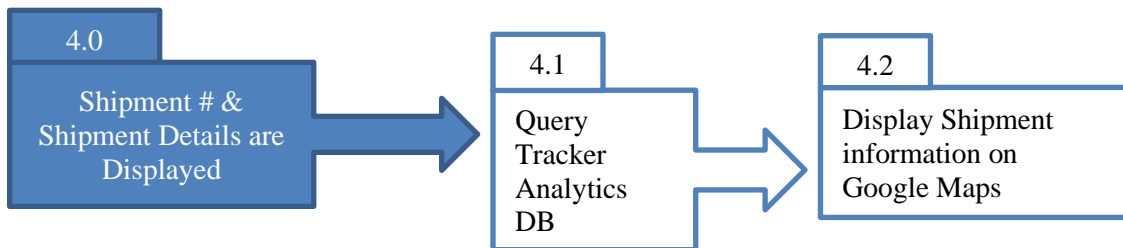
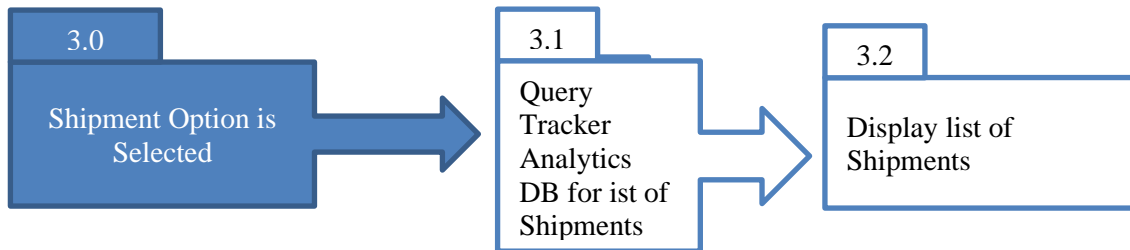
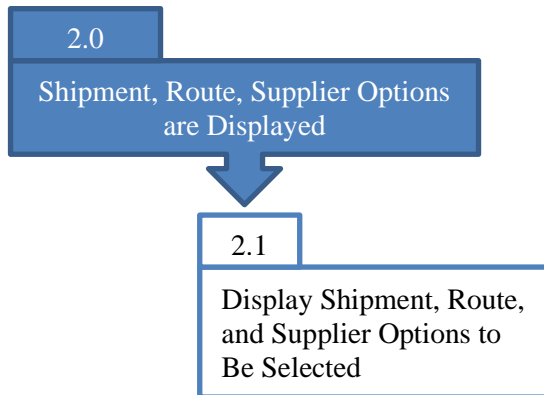
RM Number	TA_OR_001
RA Source	TA_Overview_001
RE	Contoso
Perspective	User
Date	30-Mar-2020
Date Revised	
Date Revised	
Date Stakeholder Approved	
RM Reference	TA_TD_001
RM Reference	
RM Reference	



V. Task Decomposition (TD) diagrams



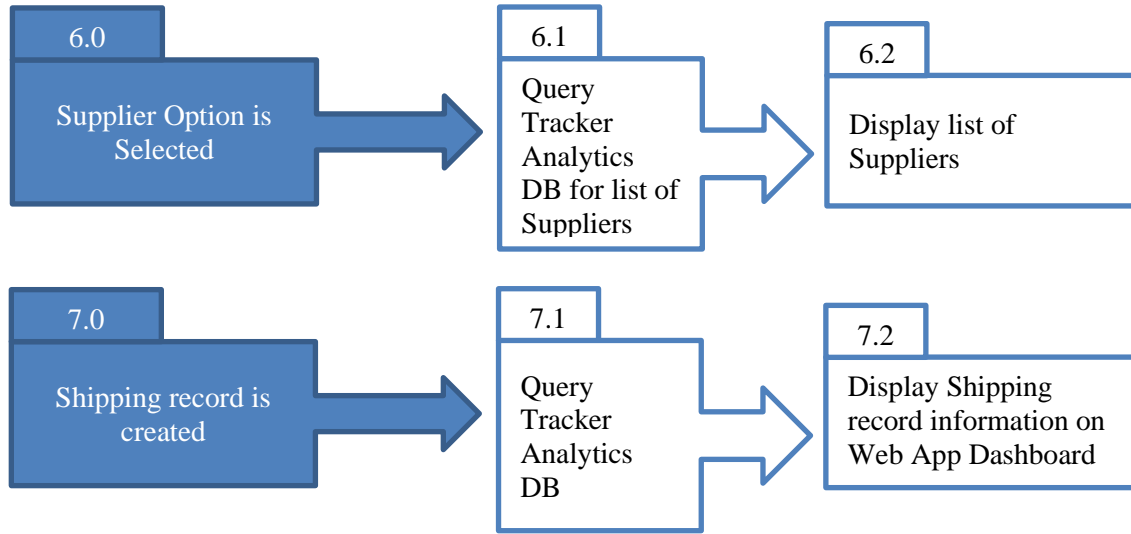
VI.	RM Number	TA_TD_001
	RA Source	TA_Overview_001
	RE	Contoso
	Perspective	User
	Date	30-Mar-2020
	Date Revised	
	Date Revised	
	Date Stakeholder Approved	
	RM Reference	TA_TT_001
	RM Reference	
	RM Reference	



Requirements Artifacts

Contoso Inc.

30-March-2020



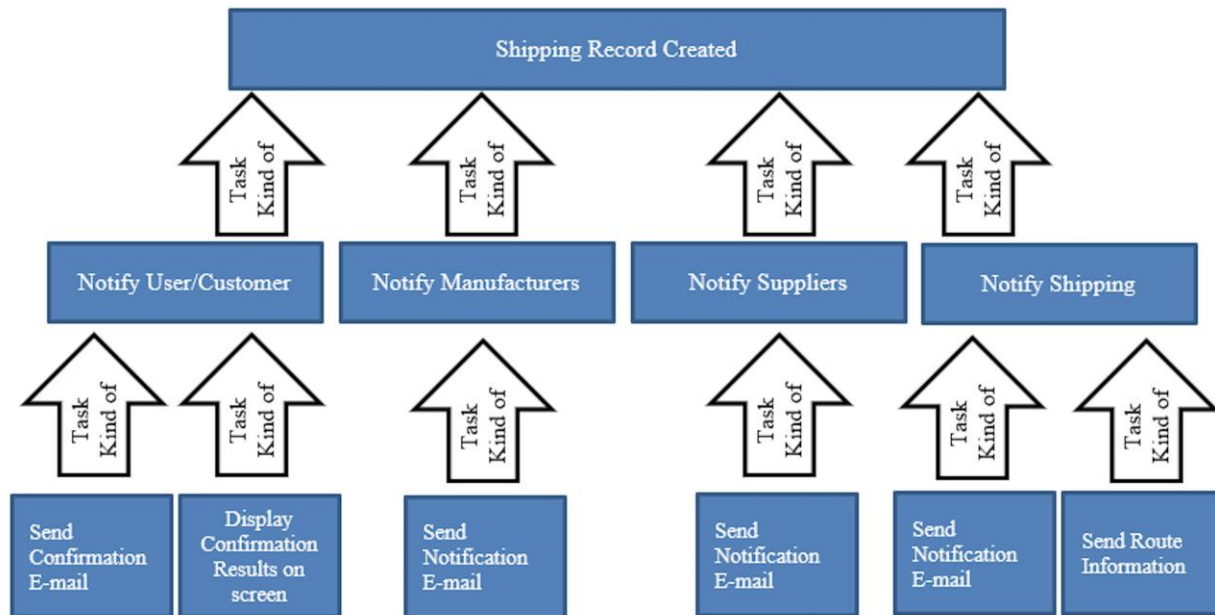
Requirements Artifacts

Contoso Inc.

30-March-2020

VI. Task Hierarchy (TH)

RM Number	TA_TH_001
RA Source	TA_Overview_001
RE	Contoso
Perspective	User
Date	30-Mar-2020
Date Revised	
Date Revised	
Date Stakeholder Approved	
RM Reference	
RM Reference	
RM Reference	



Requirements Artifacts

Contoso Inc.

30-March-2020

VII. Task Template (TT)

Task Name: *Generate Confirmation with Shipping Details*

RM Number	TA_TT_001
RA Source	TA_Overview_001
RE	Contoso
Perspective	User
Date	30-Mar-2020
Date Revised	
Date Revised	
Date Stakeholder Approved	
RM Reference	
RM Reference	
RM Reference	

Basic Task Information

<i>Decomposition Reference</i>	<i>Duration</i>	<i>Frequency</i>	<i>Location</i>
7.0	40ms	Often	User Web App Dashboard

Performers

End-user

Pre Conditions

<i>Input Data Name</i>	<i>Sending Task</i>	<i>Cardinality</i>	<i>Data Condition</i>	<i>Sending Performer</i>
OrderNumber	Send Order Confirmation	One	AvailableAtTaskStart	End-user

Resource Constraints

<i>Resource Name</i>	<i>Resource Condition</i>
Google Maps Services	AvailableBeforeTaskStart
Cosmos Database	AvailableBeforeTaskStart
Multi-factor authentication	AvailableBeforeTaskStart
Internet Connectivity	AvailableBeforeTaskStart
User Web app Dashboard	AvailableBeforeTaskStart

Post Conditions

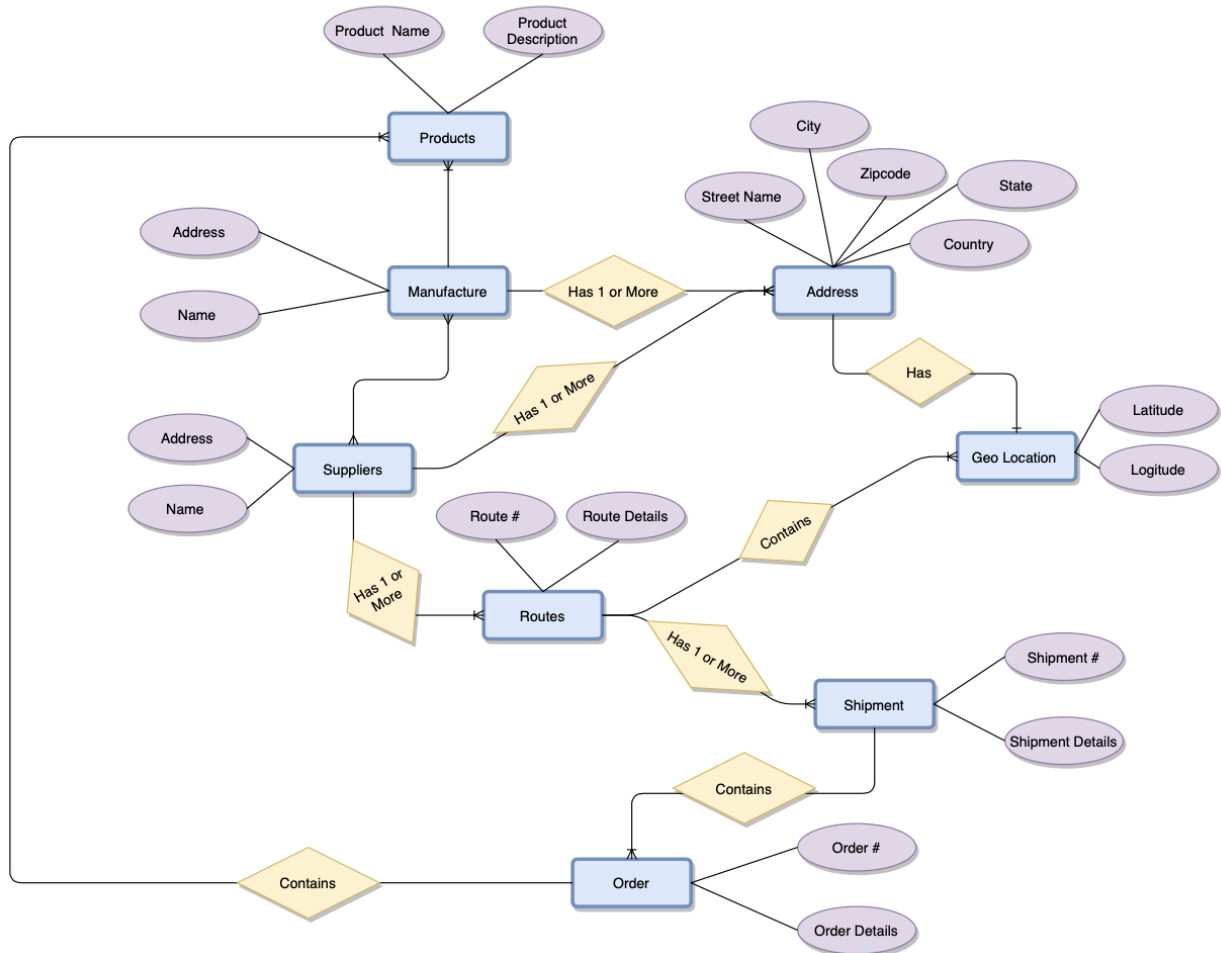
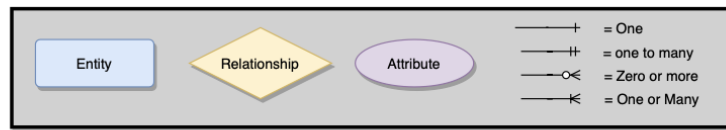
<i>Output Data Name</i>	<i>Receiving Task</i>	<i>Cardinality</i>	<i>Receiving Performer</i>
ShippingNumber	ShippinhRegistration	One	Customer, supplier, shipping, manufacturer
RouteNumber	RouteSelection	One	Customer, supplier, shipping, manufacturer
ShippingInfo	Shipping Record	One	Customer, supplier, shipping, manufacturer

Output Event

<i>Output Event Name</i>	<i>Receiving Task</i>	<i>Receiving Performer</i>
Shipping registration completed	Transmit shipping registration details	Customer, supplier, shipping, manufacturer

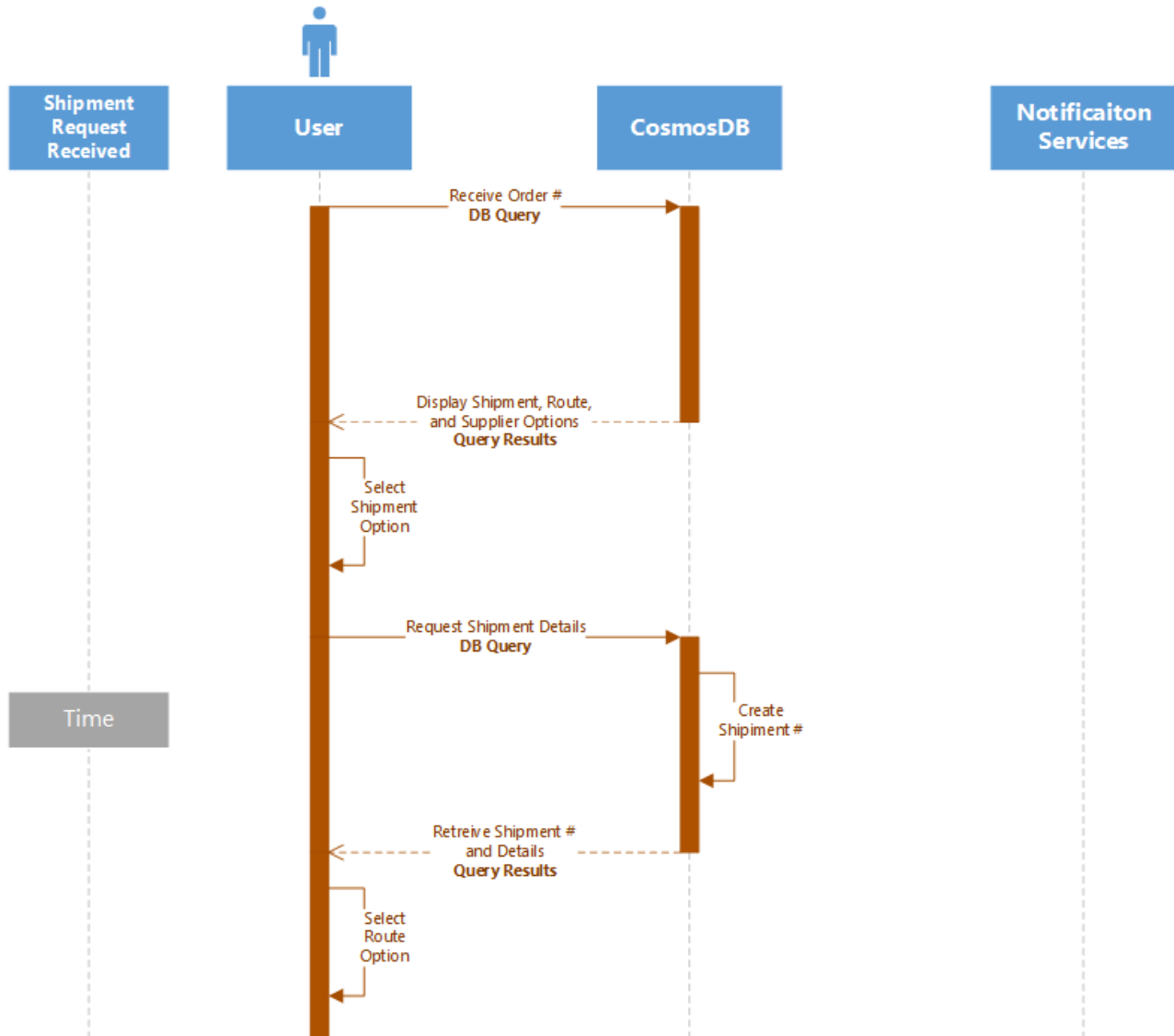
VIII. Entity-Relationship (ER) Diagrams

RM Number	TA_ER_001
RA Source	TA_Overview_001
RE	Contoso
Perspective	User
Date	30-Mar-2020
Date Revised	
Date Revised	
Date Stakeholder Approved	
RM Reference	
RM Reference	
RM Reference	



IX. Temporal Sequence (TS)

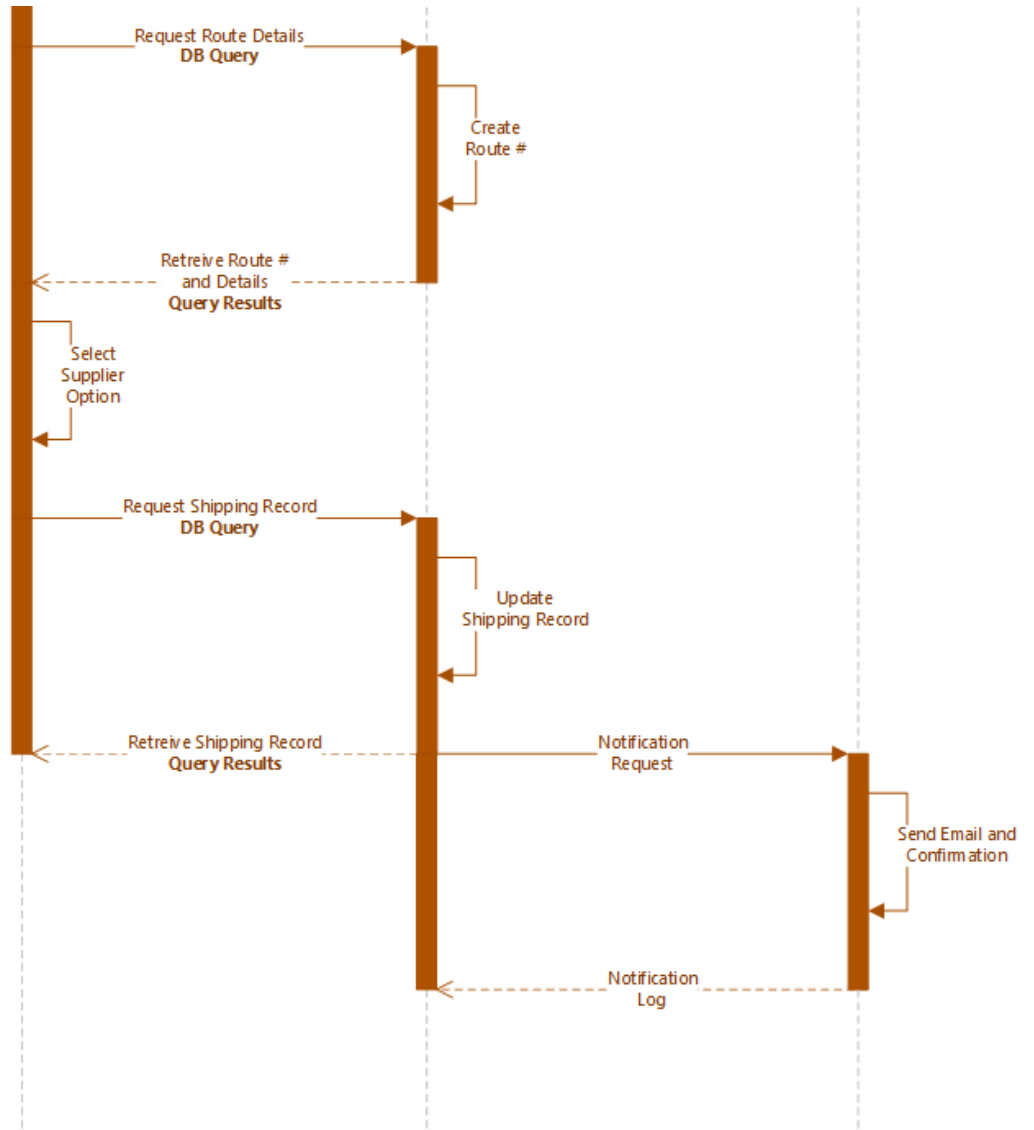
RM Number	TA_TS_001
RA Source	TA_Overview_001
RE	Contoso
Perspective	User
Date	30-Mar-2020
Date Revised	
Date Revised	
Date Stakeholder Approved	
RM Reference	
RM Reference	
RM Reference	



Requirements Artifacts

Contoso Inc.

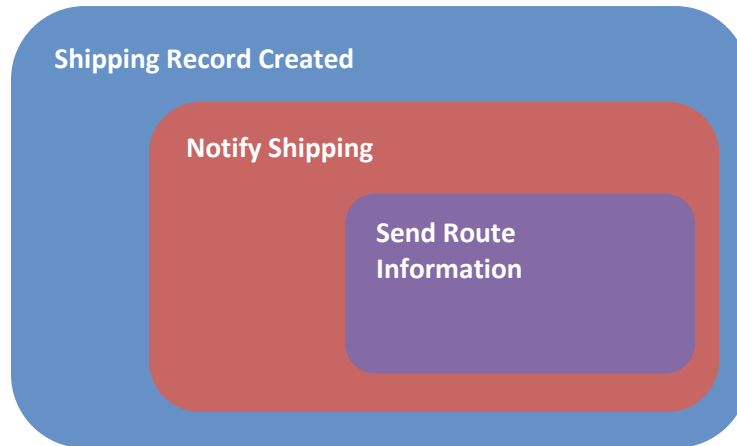
30-March-2020



Order Detail Options Completed

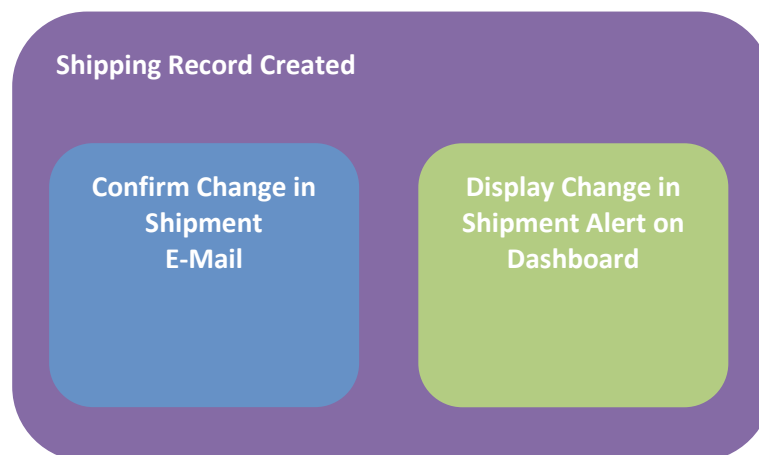
X. Inconsistency using TH and ERD

According to the TH, 'Send Route Information' is a subclass of 'Notify Shipping', which is a subclass of 'Shipping Record Created' task:



However, according to the ER, 'Shipment' has 'Routes', which in turn has routing numbers and route details. If the shipment route is not available due to natural or human-made disasters, the tracker analytics select a different viable route, or otherwise, cancelled.

If the shipment is re-routed or canceled, then the end-user and supplier receive a 'Change in Shipment Notice' e-mail, which is performed by a 'Change in Shipment' task. Also, the 'Change in Shipment' alert displays on the dashboard. Hence, 'Shipping Record Created' and 'Change in Shipment' are now Kind of Send Notification e-mail tasks and display the alert in the dashboard, which inconsistent with the earlier hierarchy.



XI. **Additional Information**

In the Task Decomposition model, the following additional information would be needed:

1. Procedure/task for change in shipment routes or cancel with the order.
 - a. What risks to account for during shipping and what measures to take.
 - b. How and who to handle cancellation in the order.
2. Procedure/task for to display shipped products and product information.
3. Procedure/task who can access each information record and what role they play on the portal.
4. Procedure/task for shipping locations and time zones.

In the Task Hierarchy diagram, additional information is required about the need to comply with International Traffic in Arms Regulations (ITAR) for sending shipping requests to only suppliers who comply.