Connected Vehicle Workshop Report

Ford Otosan + GE

Compiled by David Bingham & Chris Lyons
GE Digital Emerging Verticals
Version 1 – June 9, 2017

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Introduction

GE Digital | Ford Otosan Workshop | R&D Facility | Istanbul

This document serves as a detailed review of a two day workshop, held on May 22-23, 2017, between GE Digital and Ford Otosan.

This report will recap goals, personas, use cases and next steps, driven from cross-functional GE Digital and Ford Otosan teams.

The purpose of the workshop was to explore and define use cases that can serve as the underlying focus areas for new business models for Ford, around Connected Truck. Both teams collaboratively worked to define models that lead to new revenue streams, by providing benefits to internal and external (customers and partners) stakeholders.

The models leverage potential gains achieved via Digitalization, better insights and analytics; given more access to real-time data for a fleet of cargo trucks.

Attendees

FORD OTOSAN

Hayriye Karadeniz
CDO & IT DIRECTOR

Barış Gündüz
PROCESS ENGINEERING & SW DEV. MANAGER

Ali Başel
COMMUNICATION SYSTEMS MANAGER

Murat Yazgan
ENTERPRISE ARCHITECT

FORD OTOSAN

Engin Emekli
PD, POWERTRAIN

Kerem Köprübaşı
PD, POWERTRAIN

Serhan Ipekyun
CYBERSECURITY

Ömer Yüksel
CYBERSECURITY

Armagan Hazar
MARKETING LEADER

GE

Uygar Doyuran
COUNTRY MANAGER, TURKEY

Umut Ceyhan
TECHNICAL LEADER, TURKEY

Jakob Hall
PROGRAM MANAGER, KOC GROUP

Onur Aruz
EXECUTIVE ACCOUNT MANAGER

Ussal Sahbaz
TURKEY INNOVATION CENTER LEADER

GE

David Bingham
DESIGN DIRECTOR

Chris Lyons
PRODUCT MANAGEMENT DIRECTOR

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Agenda

Monday, May 22

09:00 - 09:15	Kick-off & Introductions
09:15 - 09:45	Goals & Objectives
09:45 - 10:45	GE Digital Overview
10:30 - 12:00	Ford Otosan Business Challenges
12:00 - 01:00	Lunch
01:00 - 01:15	Ecosystem Mapping Overview
01:15 - 02:45	Customer Ecosystem
03:00 - 04:30	Internal Beneficiaries
04:30 - 05:00	Close and Record

Tuesday, May 23

08:45 - 09:00	Day One Review
09:00 - 10:00	Internal Beneficiaries (continued)
10:00 - 12:00	Review with Marketing and R&D Teams
12:00 - 01:00	Lunch
01:00 - 02:00	CyberSecurity Conversation
02:00 - 03:00	Use-Case Review
03:00 - 04:00	Prioritization
04:00 - 05:30	Predix Capability Conversation
05:30 - 06:00	Roadmap & Nextsteps
06:00 - 06:30	Close & Record

Goals

Pre-Workshop Stated Goals

Discussions between Ford Otosan and GE have identified a number of collaboration targets. With GE teams engaging on multiple workstreams, this workshop will focus on Ford Otosan's "New Business" and connected truck initiative with the following 3 goals:

- Customer Ecosystem: Identify those groups and individuals involved in the downstream customer including fleet owners, operators, telematic providers, and maintainers. This allows us to know where data originates, who are gatekeepers to providing customer value, and establishing a roadmap of beneficiaries.
- Internal Beneficiaries: Ensure connected vehicle initiatives are able to support adjacent workstreams in supply chain, manufacturing, dealer/distribution, and product development. Balance the value in addressing external customer vs internal stakeholder needs with connected vehicle insights.
- Align Capabilities: Correlate identified beneficiaries with available historic data, tie to Ford Otosan's existing initiatives to instrument trucks, and map how GE's capabilities can assist in connecting, analyzing, and delivering connected vehicle data to both internal and externally identified stakeholders. Roadmap initiatives towards Ford Otosan's Digital Transformation.



Goals

Workshop Kick-off Goals

To start the workshop, the attendees discussed additionally desired goals for our time together. These goals were grouped as:

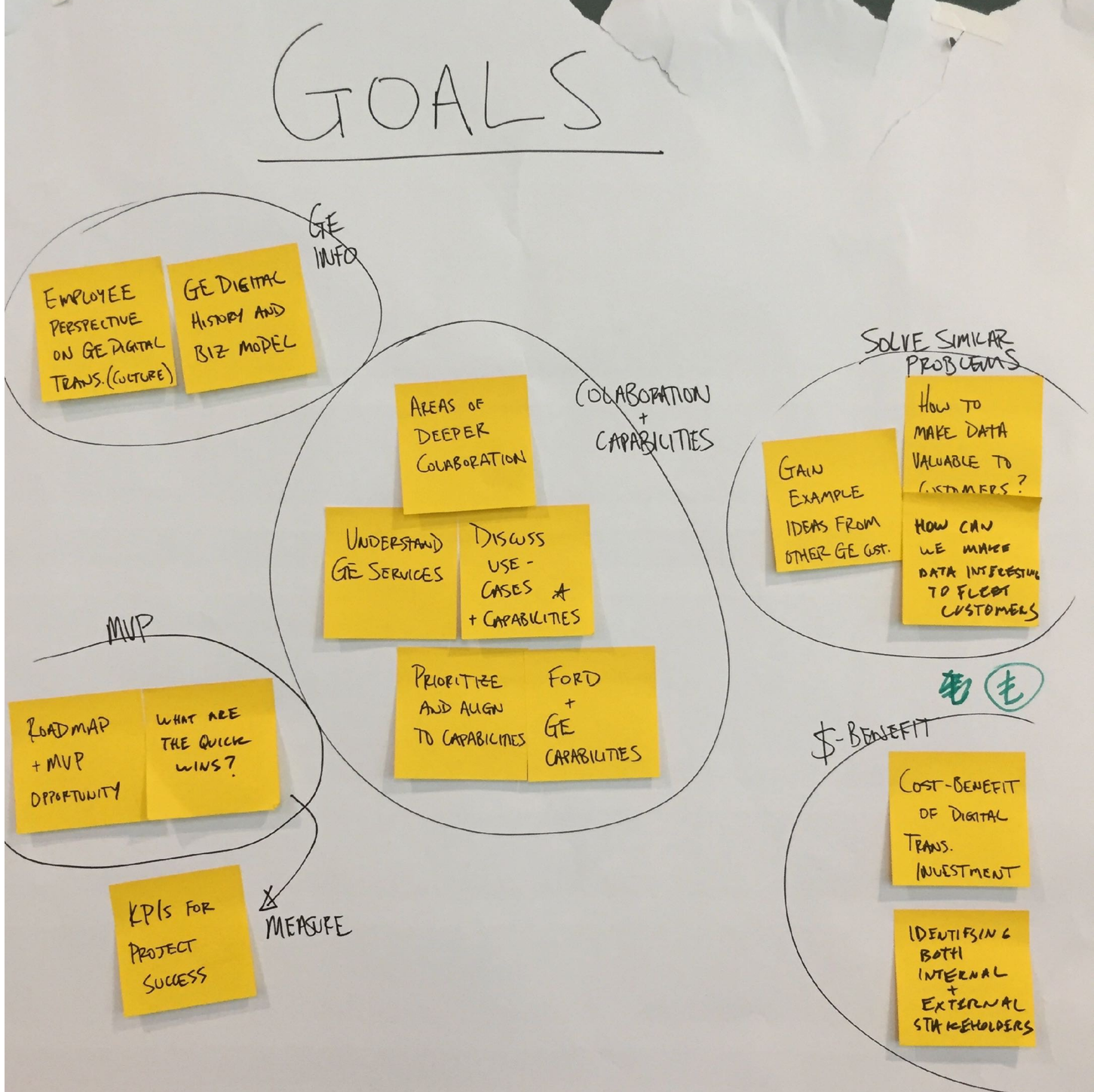
GE Info: Hearing a perspective on GE Digital's Transformation, history, and business model.

Collaboration: Understanding mutual capabilities, use-cases, and areas for deeper collaboration.

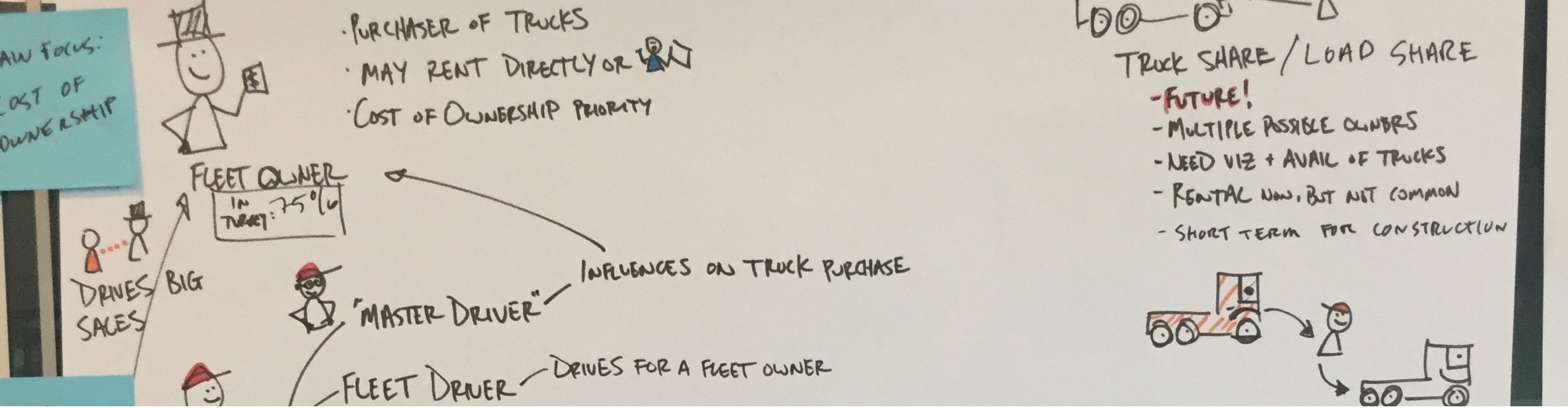
Similar Problems: Explore how GE + Ford Otosan could make data valuable to customers & share related examples.

₺-Benefit: Identify internal & external stakeholders and the cost-benefit of serving those individuals.

MVP: Create a roadmap, MVP opportunity, and KPIs needed for project success.



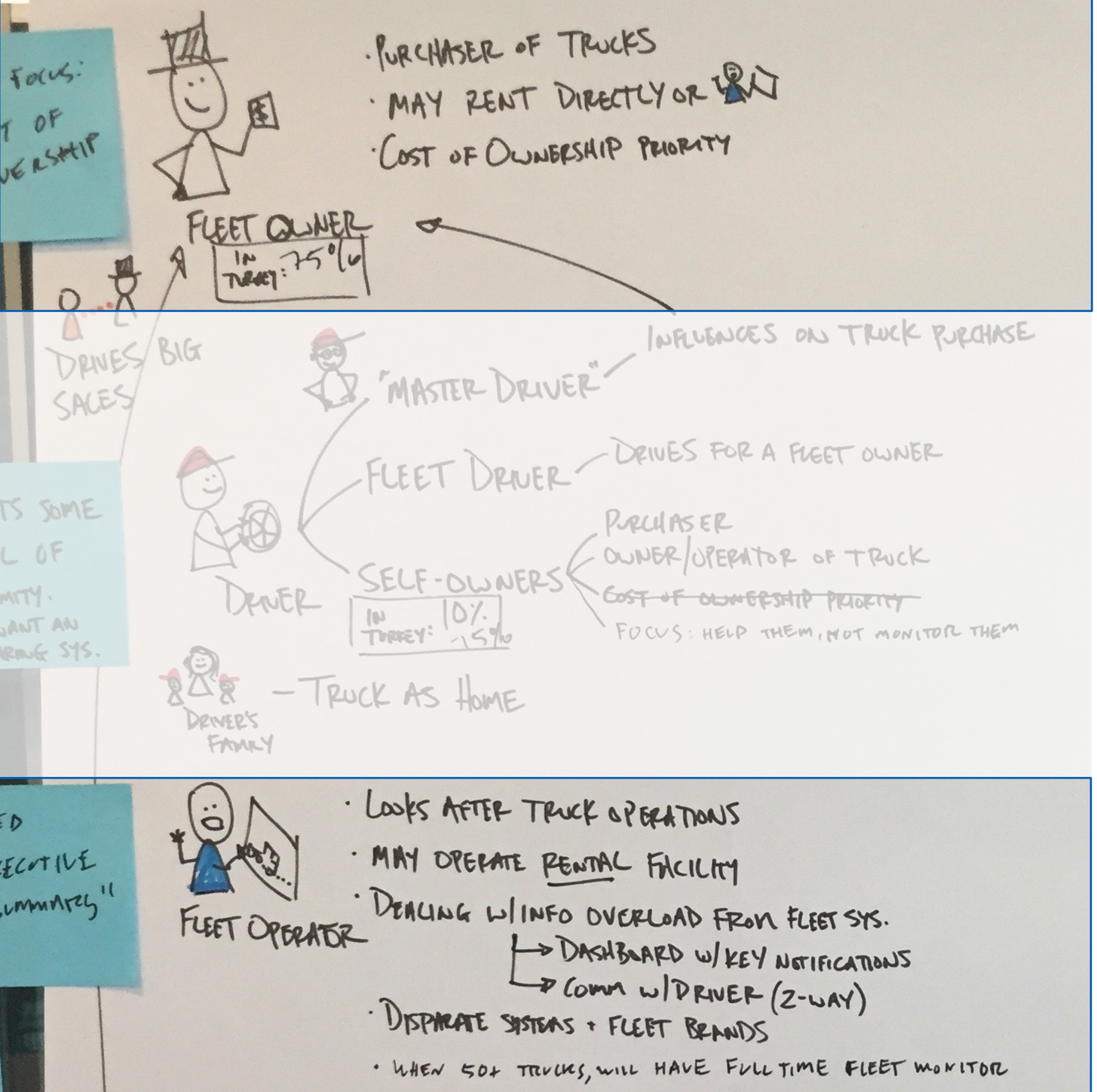
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Ecosystem Mapping

Approach

After understanding goals and sharing background information on GE and Ford Otosan, the team worked through an ecosystem mapping exercise. The intent of this process is to drive empathy amongst the team and understand problems from an end-user perspective. The first step is to outline the various personas associated to the system space. We systematically described characteristics of both internal and external beneficiaries within Ford's connected vehicle space. These briefly described personas were then put into more complex situations where we could understand the interconnections and opportunities.

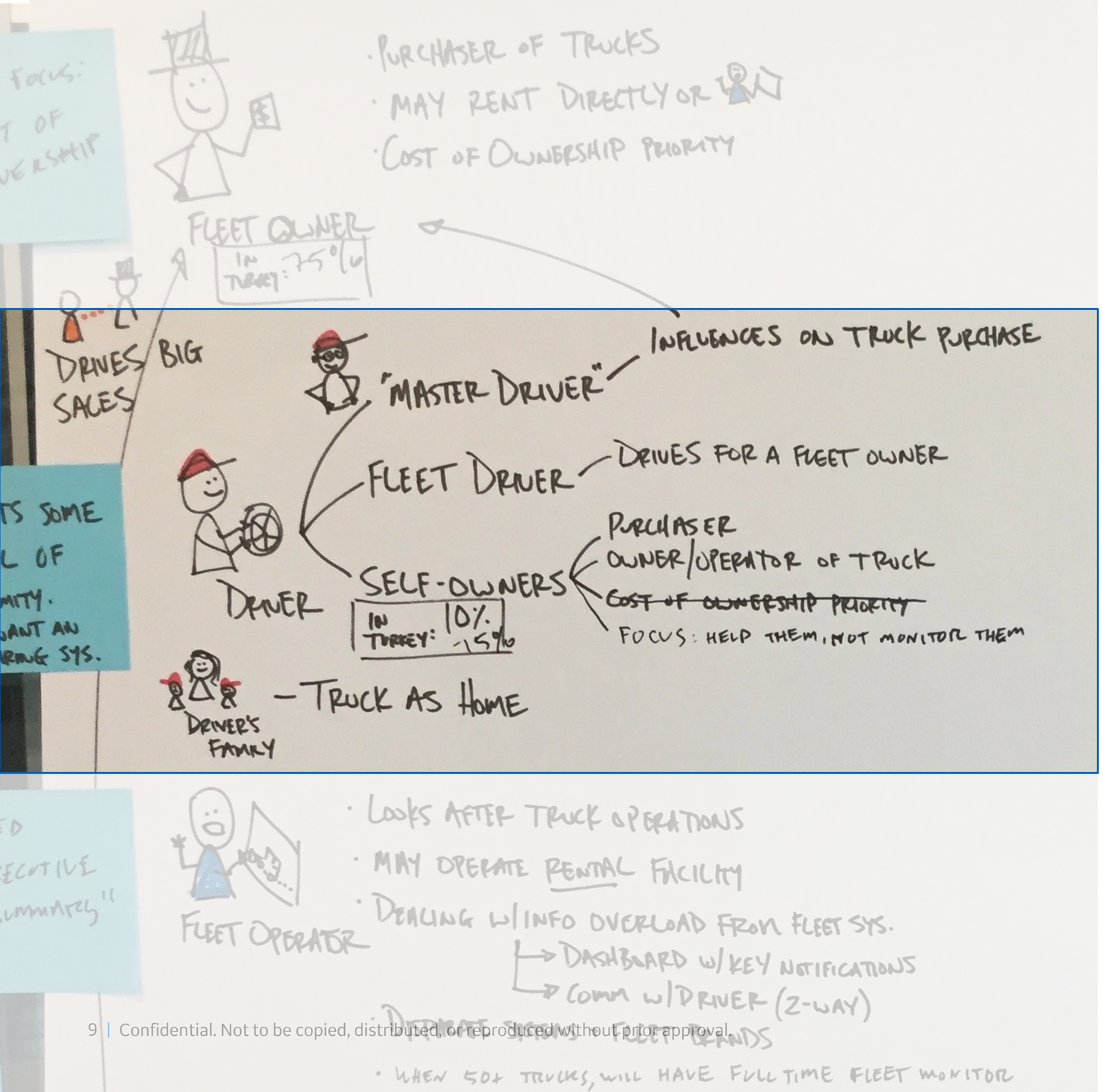


Personas

Fleet Owner & Fleet Operator

Fleet Owner: The Fleet Owner purchases trucks and is a key decision-maker. They may purchase outright or strategically mix between owned and rented trucks in coordination with operation needs and budget. Fleet Owner decisions are motivated by minimizing total cost of truck ownership.

Fleet Operator: While the Fleet Owner holds the truck title(s), the Fleet Operator looks after the truck's day to day operations. They typically manage a mixed portfolio of truck brands with a disparate set of systems used to monitor status. This variety causes a potential information overload, for which the Fleet Operator would need to hire a full-time fleet monitor and/or be provided with key notifications and intelligent status summaries.



Personas

Driver

The driver is the specific individual sitting behind the wheel of a Ford Otosan truck. Drivers can fall into 3 sub-categories:

Master Driver: A highly-skilled driver with many years of driving experience. When working within a fleet, the master driver provides guidance on truck purchases based on his experience.

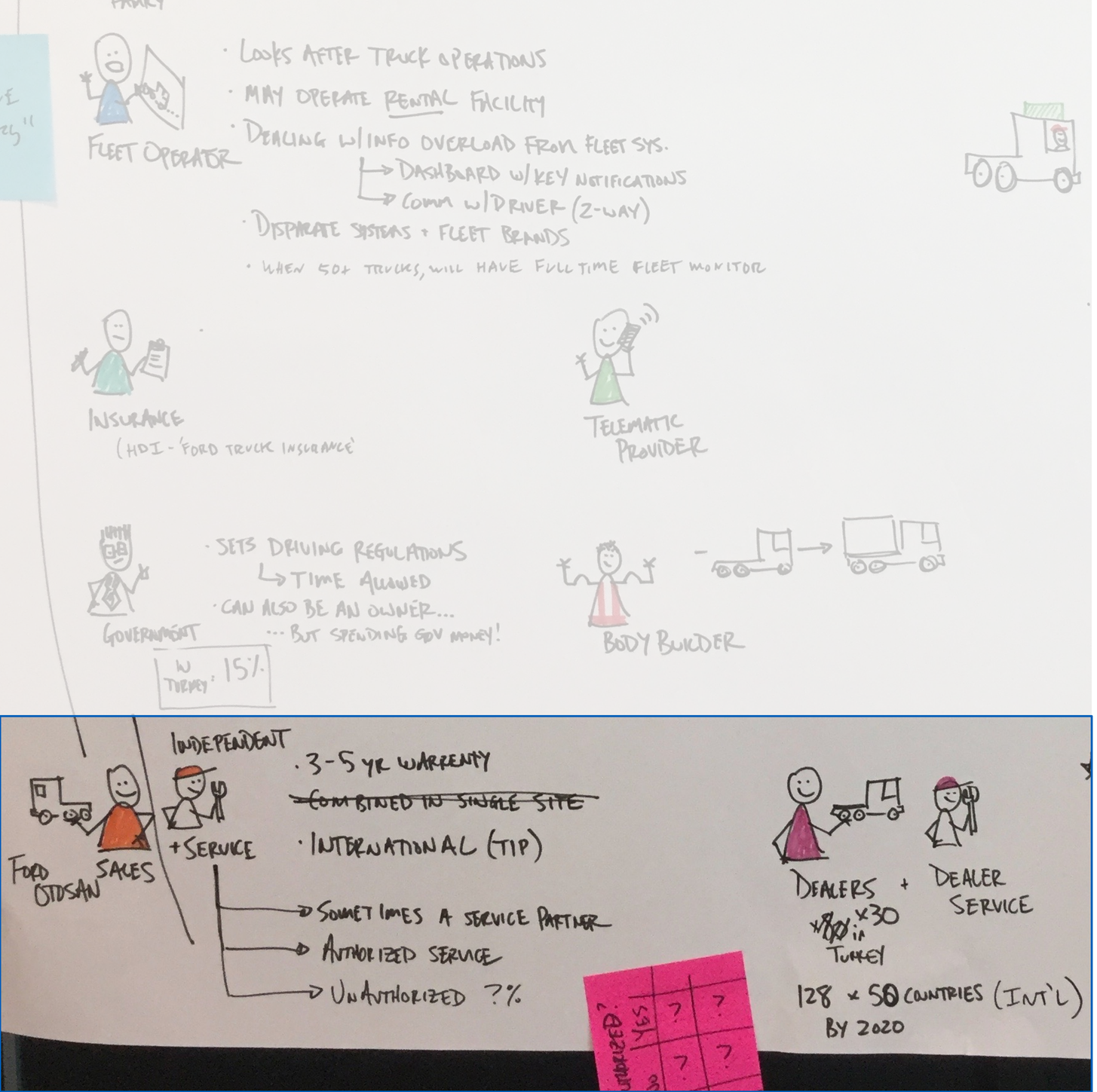
Fleet Driver: Those driving trucks in service of a specific fleet owner & fleet operator.

Self-Owners: These driver/owners are fully responsible for all aspects of their trucks.

Overall, drivers share a set of similar motivations:

- Big ego about truck and driving expertise.
- Wants anonymity without an overbearing system.
- Away from family for extended periods of time.
- Truck doubles as home when on the road.

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Personas

Sales, Dealers, & Service

Sales, Dealers, & Service people have a strong connection with fleet managers & operators.

Sales: Ford Otosan sales people. These individuals work with between Ford and Dealers to provide product inventory and information. They may work directly with Fleet Owners to help drive big sales in conjunction with the dealer.

Dealers: Dealers are the conduit by which trucks are sold to fleet owners or driver/owners. They are localized and closest to the customers and regions they serve. There are 30 dealers within Turkey and expanding to 50+ countries by 2020.

Service: Service on trucks is performed by either certified or uncertified service people. Service performed at a dealership is typically certified, while independent service may or may not be certified by Ford Otosan. Many large service jobs need to be performed at a dealer or at least by a certified service professional.



Personas

Others

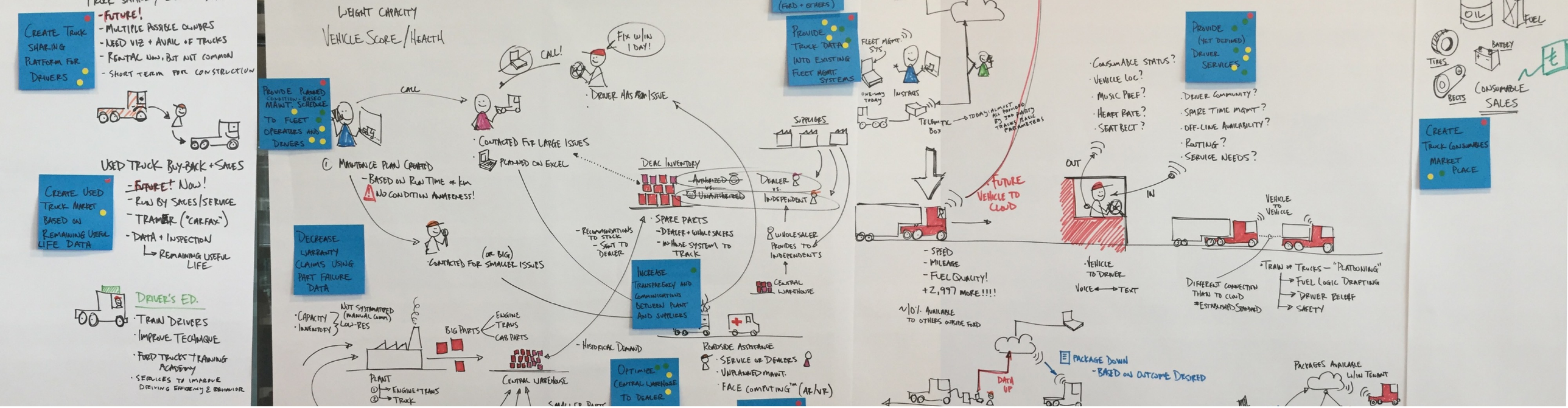
A number of other personas were mapped as part of the ecosystem, but were not considered as immediately high-value.

Insurance: Ford and third parties offer vehicle insurance. Collected operating data is very valuable to match premiums to risk.

Government: The government sets operating regulations such as the amount of time a driver can spend behind the wheel before resting. In some cases, they are also fleet owners, representing ~15% of truck sales in Turkey.

Telematic Provider: Telematic providers operate connectivity from truck to cloud and may offer value added services to the fleet owner.

Body Builder: Body builders convert trucks from raw platforms to specific utility trucks such as garbage, container, or liquid hauling.



Use-Cases

Identify specific use-cases within ecosystem

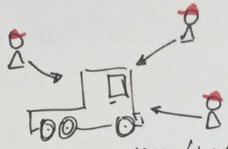
The defined personas were then placed into scenarios described by the Ford Otosan team. This provided context to their defined roles and a broader understanding around interactions and information exchange. As we sketched these relationships, a number of identifiable use-cases and desirable outcomes began to surface. Each blue post-it notes represents a use-case adjacent to the sketched portion of the ecosystem. The following section presents the overall ecosystem, then dives into each of those specific use-cases.

NOTES

ADDITIONAL STAKEHOLDERS

USE-CASES

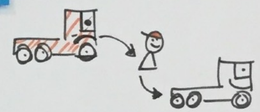
A DOT = VALUABLE FEASIBLE



TRUCK SHARE / LOAD SHARE

CREATE TRUCK SHARING PLATFORM FOR DRIVERS

-FUTURE!
- MULTIPLE PASSIVE CLIMBERS
- USED VIZ + AVAIL OF TRUCKS
- RENTAL NOW, BUT NOT COMMON
- SHORT TERM FOR CONSTRUCTION



USED TRUCK BUY-BACK + SALES

CREATE USED TRUCK MARKET BASED ON REMAINING USEFUL LIFE DATA

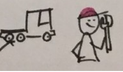
-FUTURE! NOW!
- RUN BY SALES/SERVICE
- TRAMER ("CARFAX")
- DATA + INSPECTION → REMAINING USEFUL LIFE



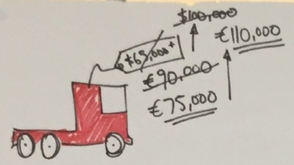
DRIVER'S ED.

- TRAIN DRIVERS
- IMPROVE TECHNIQUE
- FORD TRUCKS TRAINING ACADEMY
- SERVICES TO IMPROVE DRIVING EFFICIENCY & BEHAVIOR





☆REDUCE UNAUTHORIZED SERVICE CENTERS

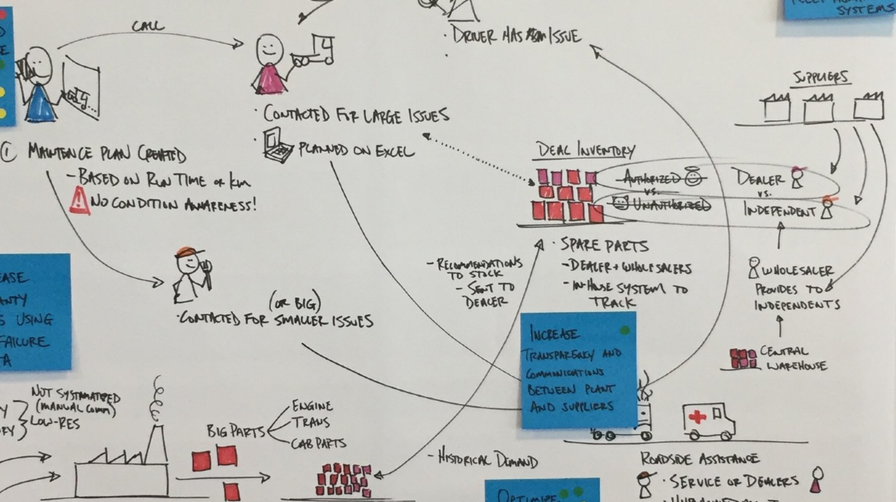


FUEL CONSUMPTION: (VARIES BY DUTY) ~4km/litre 24.2L/100km

WEIGHT CAPACITY

VEHICLE SCORE/HEALTH

PROVIDE PLANNED CONDITION-BASED MAINT. SCHEDULE TO FLEET OPERATORS AND DRIVERS



DECREASE WARRANTY CLAIMS USING PART FAILURE DATA

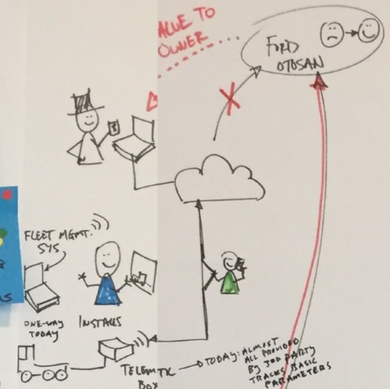
INCREASE TRANSPARENCY AND COMMUNICATIONS BETWEEN PLANT AND SUPPLIERS

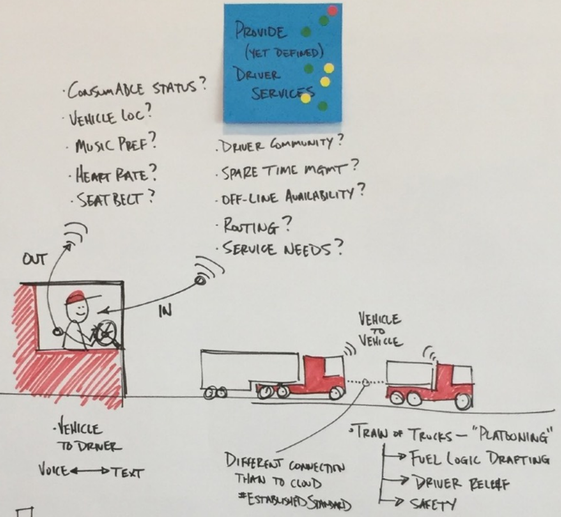
OPTIMIZE CENTRAL WAREHOUSE TO DEALER SUPPLY CHAIN

MONETIZE WARRANTY + QUALITY DATA TO SUPPLIERS

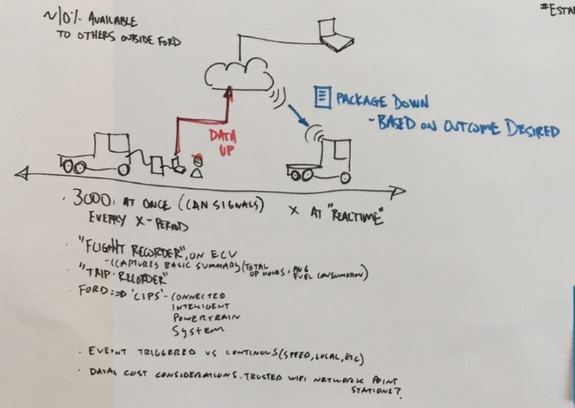
DEVELOP AN EXTENSIBLE FLEET MGMT SYSTEM (FORD + OTHERS)

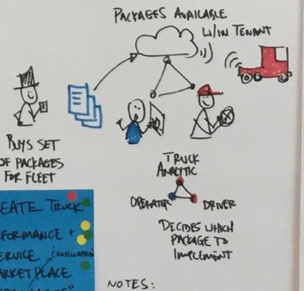
PROVIDE TRUCK DATA INTO EXISTING FLEET MGMT. SYSTEMS





PROVIDE (YET DEFINED) DRIVER SERVICES





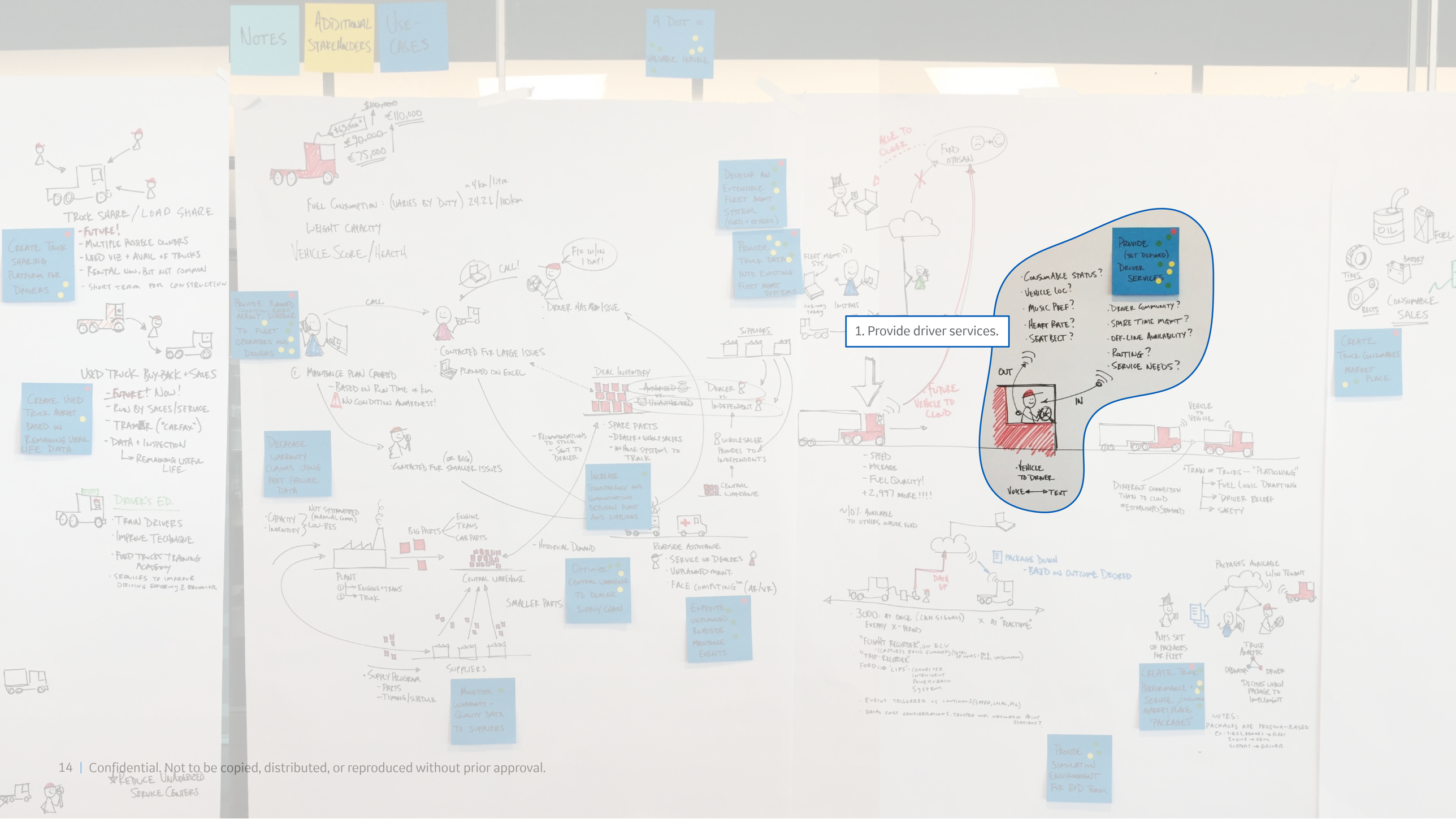
CREATE TRUCK PERFORMANCE + SERVICE CONFIGURATION MARKETPLACE "PACKAGES"

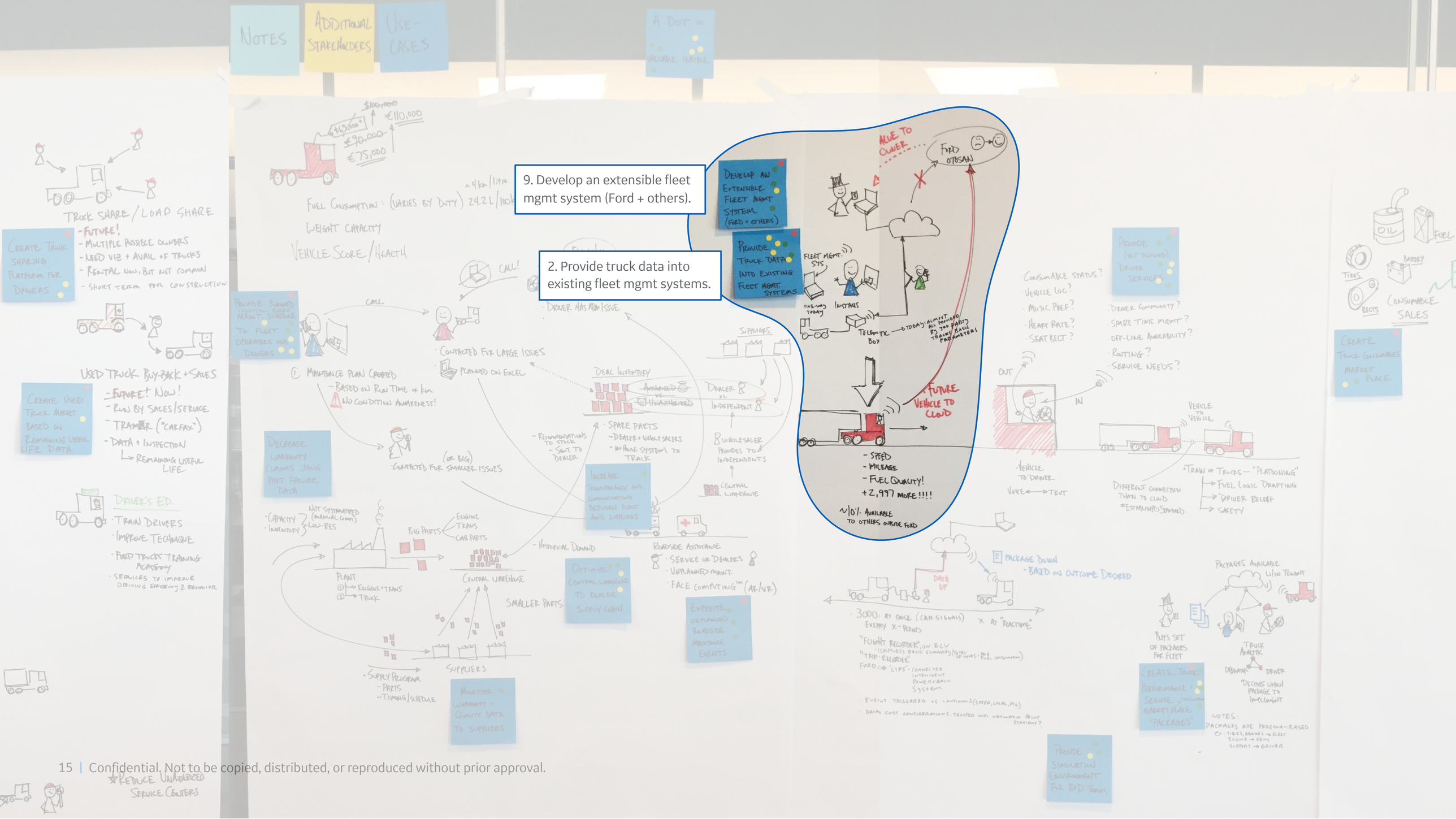
NOTES:
PACKAGES ARE PERSONA-BASED
EX: TIRES, BRAKES → FLEET
ENGINE → OEM
SUPPORT → DRIVER

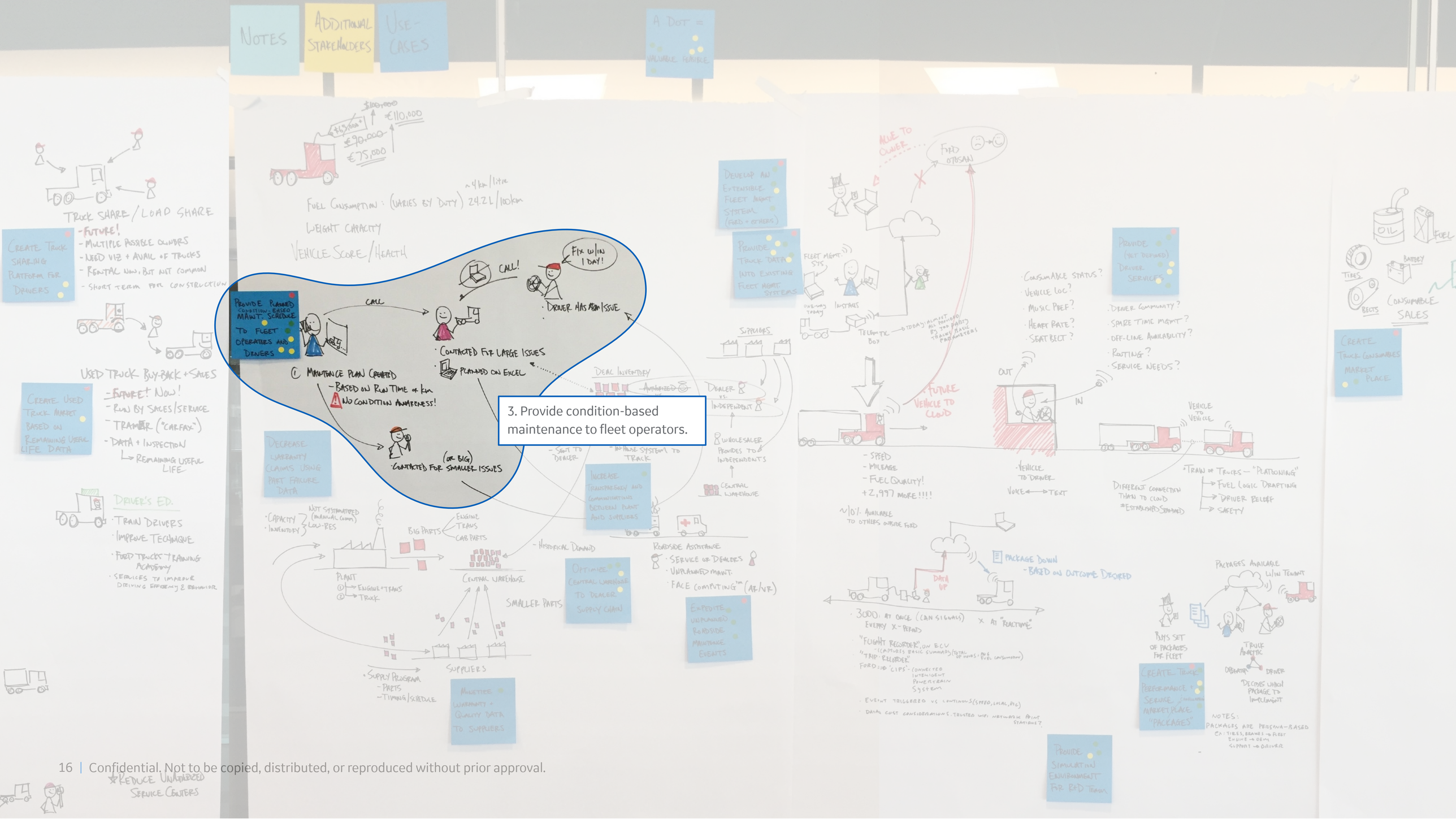
PROVIDE SIMULATION ENVIRONMENT FOR R+D TEAM

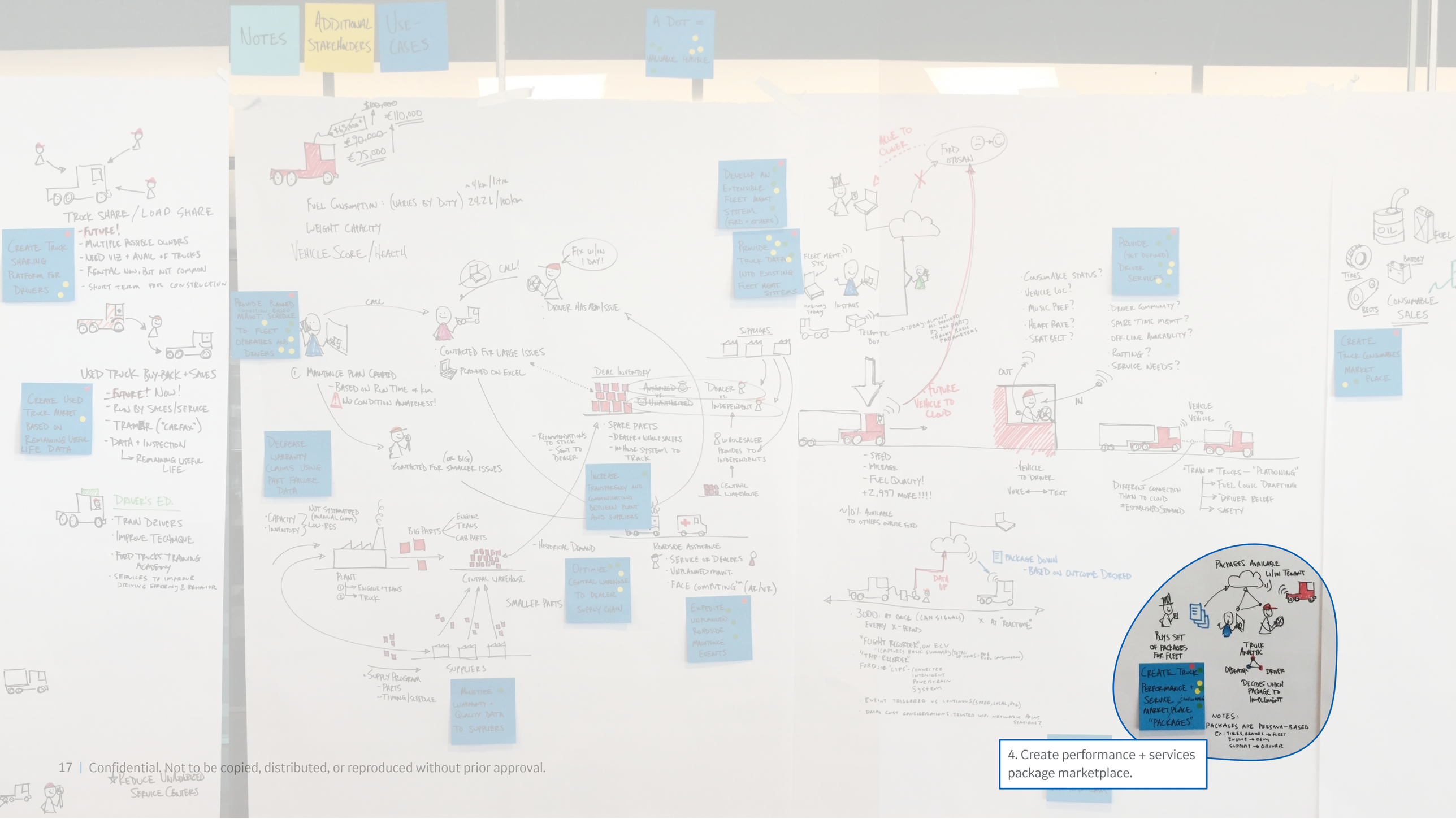


CREATE TRUCK CONSUMABLES MARKETPLACE

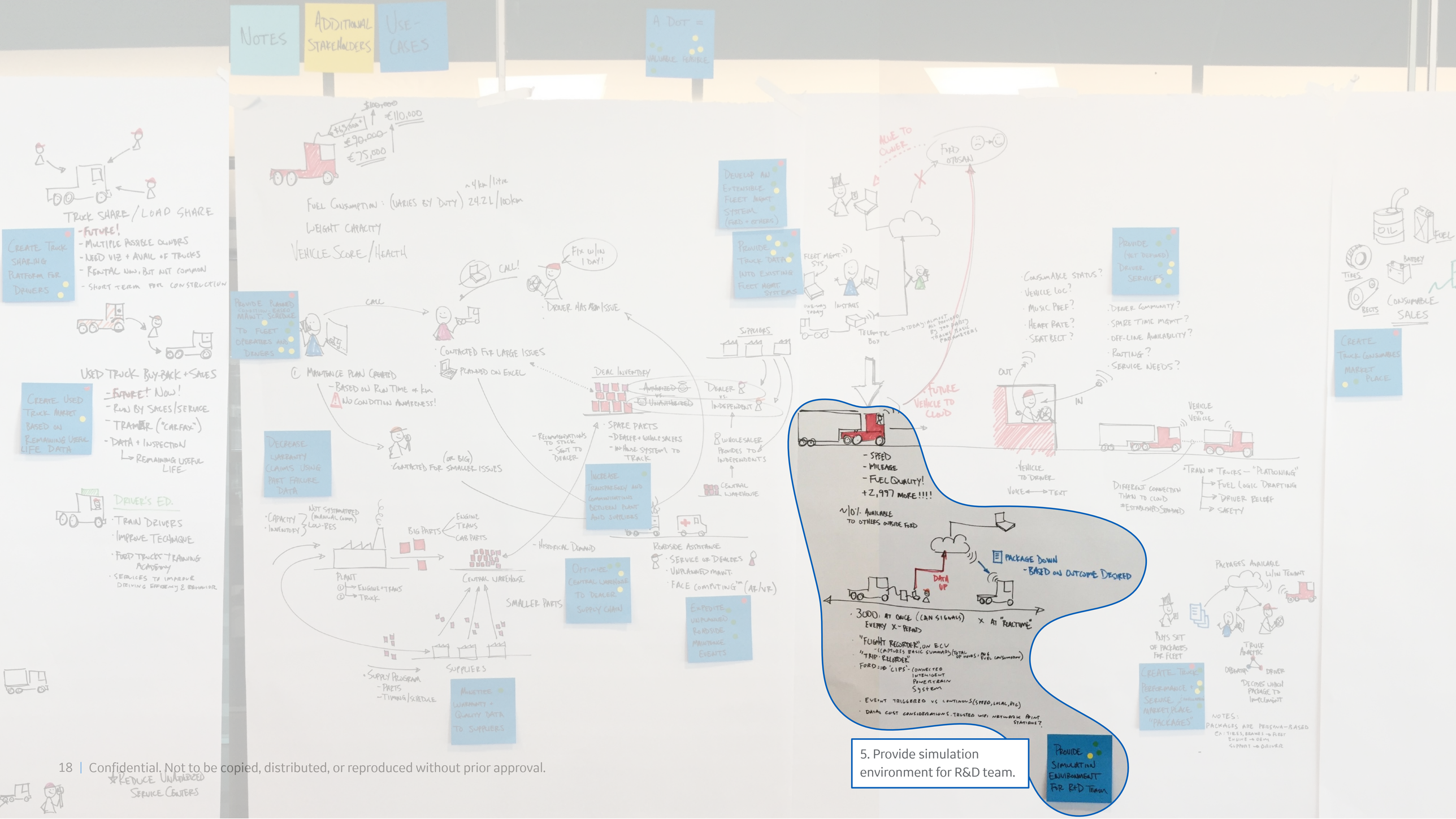

NOTES
ADDITIONAL STAKEHOLDERS
USE-CASES
A DOT =
VALUABLE FEASIBLE
TRUCK SHARE / LOAD SHARE
- FUTURE!
- MULTIPLE PASSIVE OWNERS
- USED VIZ + AVAIL OF TRUCKS
- RENTAL NOW, BUT NOT COMMON
- SHORT TERM FOR CONSTRUCTION
CREATE TRUCK SHARING PLATFORM FOR DRIVERS
USED TRUCK BUY-BACK + SALES
- FUTURE! NOW!
- RUN BY SALES/SERVICE
- TRANSFER ("CARFAX")
- DATA + INSPECTION
→ REMAINING USEFUL LIFE
CREATE USED TRUCK MARKET BASED ON REMAINING USEFUL LIFE DATA
DRIVER'S ED.
- TRAIN DRIVERS
- IMPROVE TECHNIQUE
- FORD TRUCKS TRAINING ACADEMY
- SERVICES TO IMPROVE DRIVING EFFICIENCY & BEHAVIOR
$105,000
$85,000
$90,000
$75,000
€110,000
FUEL CONSUMPTION: (VARIES BY DUTY) 24.2L/100km
~4km/litre
WEIGHT CAPACITY
VEHICLE SCORE/HEALTH
PROVIDE RUGGED CONDITIONS BASED MAINT. SCHEDULE TO FLEET OPERATORS AND DRIVERS
CALL
CALL!
FIX W/IN 1 DAY!
DRIVER HAS ISSUE
CONTACTED FIX LARGE ISSUES
PLANNED ON EXCEL
1 MAINTENANCE PLAN CREATED
- BASED ON RUN TIME or km
NO CONDITION AWARENESS!
CONTACTED FOR SMALLER ISSUES (OR BIG)
DECREASE WARRANTY CLAIMS USING PART FAILURE DATA
INCREASE TRANSPARENCY AND COMMUNICATIONS BETWEEN PLANT AND SUPPLIERS
- RECOMMENDATIONS TO STOCK
- SENT TO DEALER
DEAL INVENTORY
AUTHORIZED vs UNAUTHORIZED
DEALER vs INDEPENDENT
SUPPLIERS
- SPARE PARTS
- DEALER + WHOLESALERS
- IN-HOUSE SYSTEM TO TRACK
WHOLESALER PROVIDES TO INDEPENDENTS
CENTRAL WAREHOUSE
ROADSIDE ASSISTANCE
- SERVICE OR DEALERS
- UNPLANNED MAINT.
- FACE COMPUTING™ (AR/VR)
- HISTORICAL DEMAND
OPTIMIZE CENTRAL WAREHOUSE TO DEALER SUPPLY CHAIN
EXPEDITE UNPLANNED ROADSIDE MAINTENANCE EVENTS
- CAPACITY
- INVENTORY
NOT SYSTEMATIZED (MANUAL COMM) LOW-RES
PLANT
① ENGINE + TRANS
② TRUCK
BIG PARTS
ENGINE
TRANS
CAB PARTS
CENTRAL WAREHOUSE
SMALLER PARTS
SUPPLIERS
- SUPPLY PROGRAM
- PARTS
- TIMING/SCHEDULE
MONETIZE WARRANTY + QUALITY DATA TO SUPPLIERS
DEVELOP AN EXTENSIBLE FLEET MGMT SYSTEM (FORD + OTHERS)
PROVIDE TRUCK DATA INTO EXISTING FLEET MGMT. SYSTEMS
FLEET MGMT. SYS
OWN-WAY TODAY
INSTALLS
ABLE TO CLONE
FORD OTOSAN
1. Provide driver services.
FUTURE VEHICLE TO CLOUD
- SPEED
- MILEAGE
- FUEL QUALITY!
+2,997 MORE!!!!
~10% AVAILABLE TO OTHERS OUTSIDE FORD
PROVIDE (YET DEFINED) DRIVER SERVICES
- CONSUMABLE STATUS?
- VEHICLE LOC?
- MUSIC PREF?
- HEART RATE?
- SEAT BELT?
- DRIVER COMMUNITY?
- SPARE TIME MGMT?
- OFF-LINE AVAILABILITY?
- ROUTING?
- SERVICE NEEDS?
OUT
IN
VEHICLE TO DRIVER
VOICE ↔ TEXT
VEHICLE TO VEHICLE
DIFFERENT CONNECTION THAN TO CLOUD
*ESTABLISHED STANDARD
"TRAIN OF TRUCKS – "PLATOONING"
FUEL LOGIC DRAFTING
DRIVER RELIEF
SAFETY
PACKAGE DOWN
- BASED ON OUTCOME DESIRED
DATA UP
- 3000+ AT ONCE (CAN SIGNALS) EVERY X-PERIOD
X AT "REALTIME"
"FLIGHT RECORDER" ON ECU
- (CAPTURES BASIC SUMMARY (TOTAL # OF HRS, MI, FUEL CONSUMPTION)
"TRIP RECORDER"
FORD: 'CIPS' - (CONNECTED INTELLIGENT POWERTRAIN SYSTEM
- EVENT TRIGGERED VS CONTINUOUS (SPEED, LATERAL, ETC)
- DATA COST CONSIDERATIONS - TRUSTED WIFI NETWORK POINT STATIONS?
PACKAGES AVAILABLE W/IN TENANT
BUYS SET OF PACKAGES FOR FLEET
CREATE TRUCK PERFORMANCE + SERVICE CONSUMABLE MARKETPLACE "PACKAGES"
TRUCK ANALYTIC
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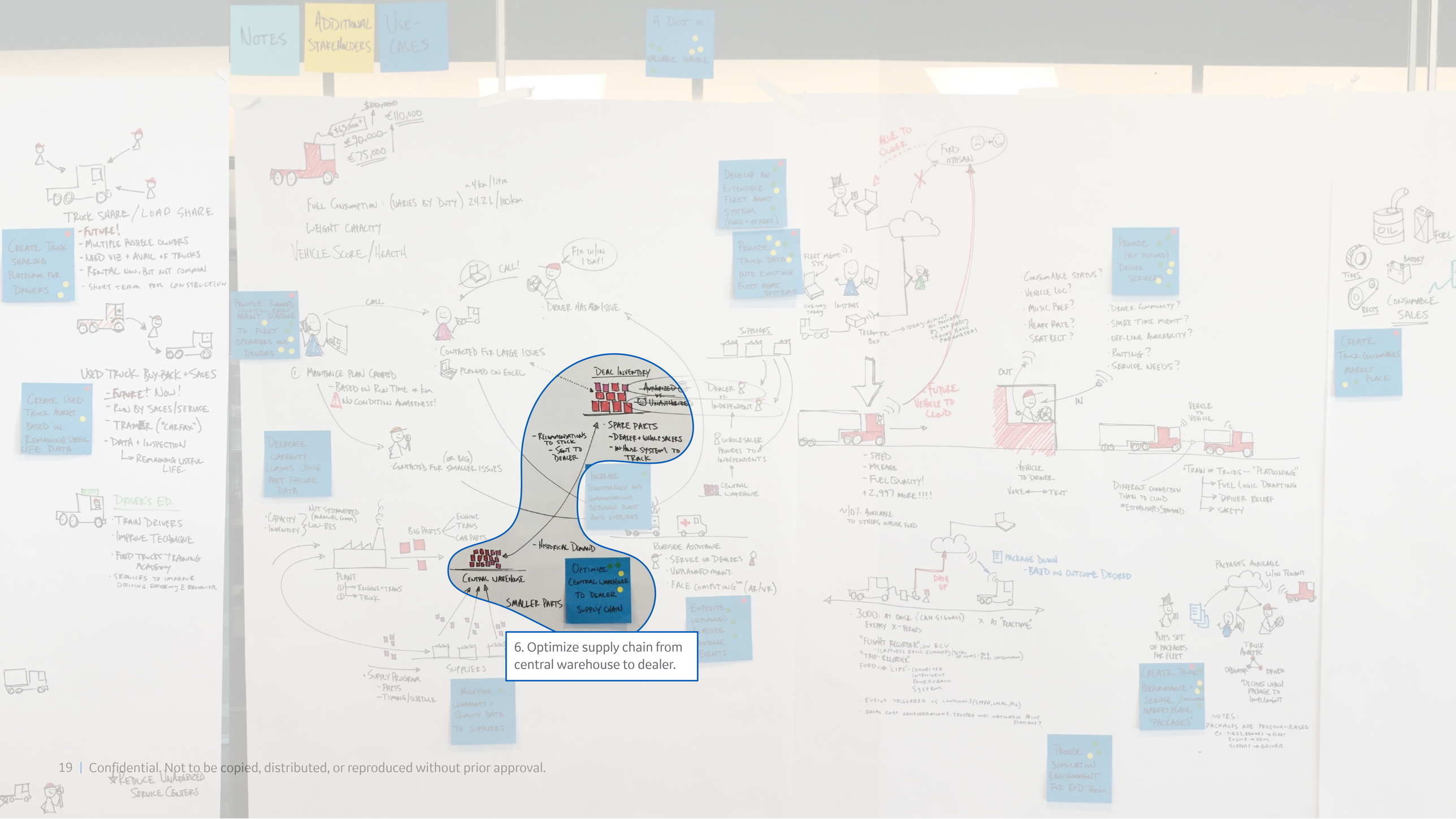

9. Develop an extensible fleet mgmt system (Ford + others).
2. Provide truck data into existing fleet mgmt systems.
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FLEET MGMT. SYS
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INSTALLS
TELEMATIC BOX
TODAY: ALMOST ALL REPORTED BY 3RD PARTY TRACKING MAGIC PARAMETERS
FUTURE VEHICLE TO CLOUD
- SPEED
- MILEAGE
- FUEL QUALITY!
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IN
VEHICLE TO DRIVER
VOICE ↔ TEXT
PROVIDE (NOT DEFINED) DRIVER SERVICES
DRIVER COMMUNITY?
SPARE TIME MGMT?
OFF-LINE AVAILABILITY?
ROUTING?
SERVICE NEEDS?
VEHICLE TO VEHICLE
DIFFERENT CONNECTION THAN TO CLOUD
*ESTABLISHED STANDARD
"TRAIN OF TRUCKS — "PLATOONING"
- FUEL LOGIC DRAFTING
- DRIVER RELIEF
- SAFETY
OIL
FUEL
TIRES
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BRAKES
CONSUMABLE SALES
CREATE TRUCK CONSUMABLES MARKET PLACE
PACKAGE DOWN
- BASED ON OUTCOME DESIRED
DATA UP
3000+ AT ONCE (CAN SIGNALS) EVERY X-PERIOD
X AT "REALTIME"
"FLIGHT RECORDER" ON ECU
- (CAPTURES BASIC SUMMARY (TOTAL OF HOURS, AVG FUEL CONSUMPTION)
"TRIP RECORDER"
FORD :=D 'CIPS' - (CONNECTED INTELLIGENT POWERTRAIN SYSTEM
- EVENT TRIGGERED VS CONTINUOUS (SPEED, LOCAL, ETC)
- DATA COST CONSIDERATIONS - TRUSTED WIFI NETWORK POINT STATIONS?
PACKAGES AVAILABLE W/IN TENANT
BUYS SET OF PACKAGES FOR FLEET
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TRUCK ANALYTIC
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DECIDES WHICH PACKAGE TO IMPLEMENT
NOTES:
PACKAGES ARE PERSONA-BASED
EX: TIRES, BRAKES → FLEET
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PROVIDE SIMULATION ENVIRONMENT FOR R&D TEAM
REDUCE UNAUTHORIZED SERVICE CENTERS

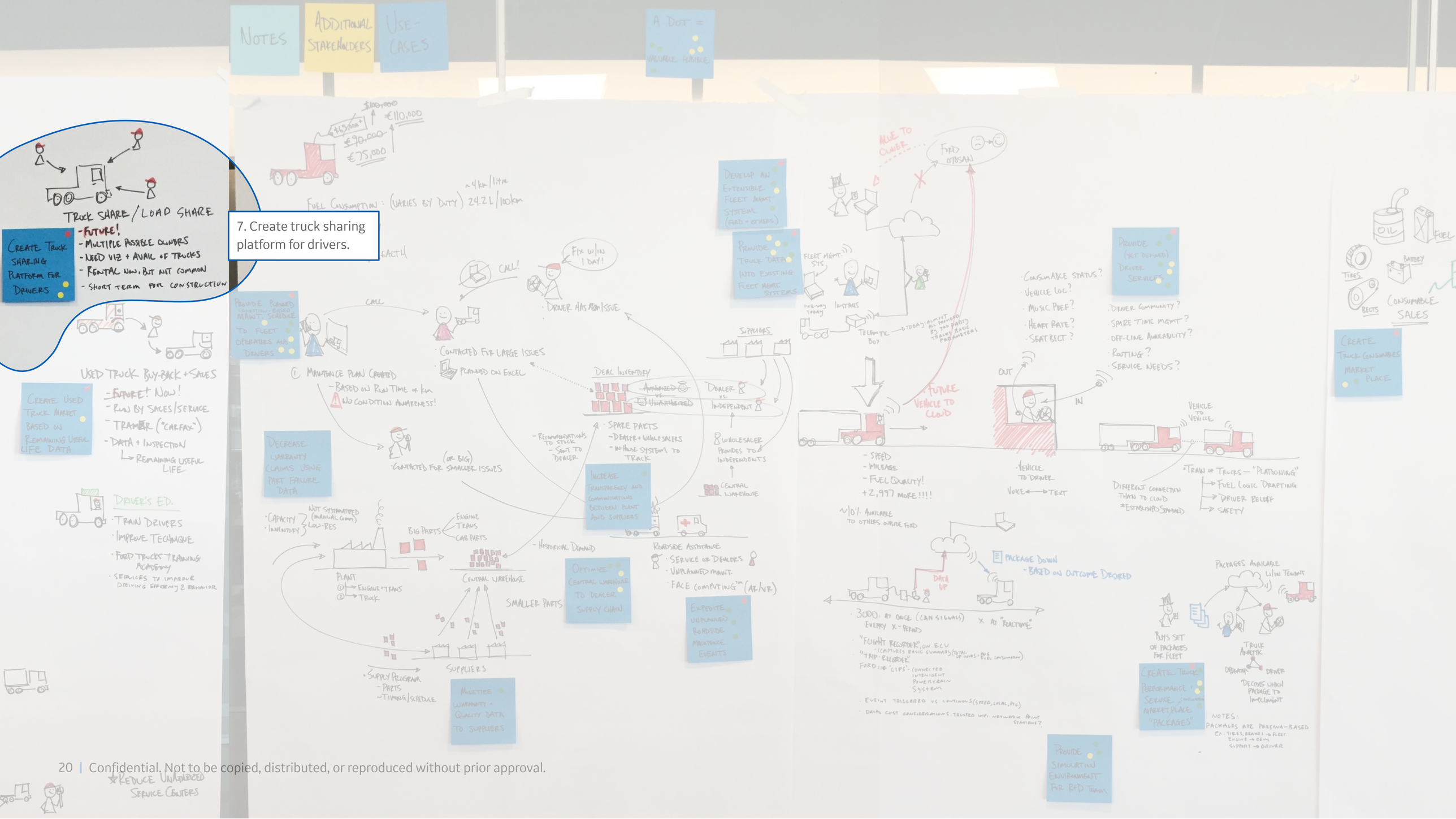

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USE-CASES
A DOT =
VALUABLE FEASIBLE
TRUCK SHARE / LOAD SHARE
- FUTURE!
- MULTIPLE PASSIVE OWNERS
- NEED VIZ + AVAIL OF TRUCKS
- RENTAL NOW, BUT NOT COMMON
- SHORT TERM FOR CONSTRUCTION
CREATE TRUCK SHARING PLATFORM FOR DRIVERS
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→ REMAINING USEFUL LIFE
CREATE USED TRUCK MARKET BASED ON REMAINING USEFUL LIFE DATA
DRIVER'S ED.
· TRAIN DRIVERS
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FUEL CONSUMPTION: (VARIES BY DUTY) ~4km/litre 24.2L/100km
WEIGHT CAPACITY
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PROVIDE PLANNED CONDITION-BASED MAINT. SCHEDULE TO FLEET OPERATORS AND DRIVERS
CALL
CALL!
FIX W/IN 1 DAY!
· DRIVER HAS ISSUE
· CONTACTED FIX LARGE ISSUES
· PLANNED ON EXCEL
① MAINTENANCE PLAN CREATED
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· CONTACTED FOR SMALLER ISSUES (OR BIG)
3. Provide condition-based maintenance to fleet operators.
DECREASE WARRANTY CLAIMS USING PART FAILURE DATA
· CAPACITY
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PLANT
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SUPPLIERS
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OPTIMIZE CENTRAL WAREHOUSE TO DEALER SUPPLY CHAIN
DEAL INVENTORY
SUPPLIERS
DEALER vs. INDEPENDENT
- SENT TO DEALER
- IN HOUSE SYSTEM TO TRACK
WHOLESALER PROVIDES TO INDEPENDENTS
CENTRAL WAREHOUSE
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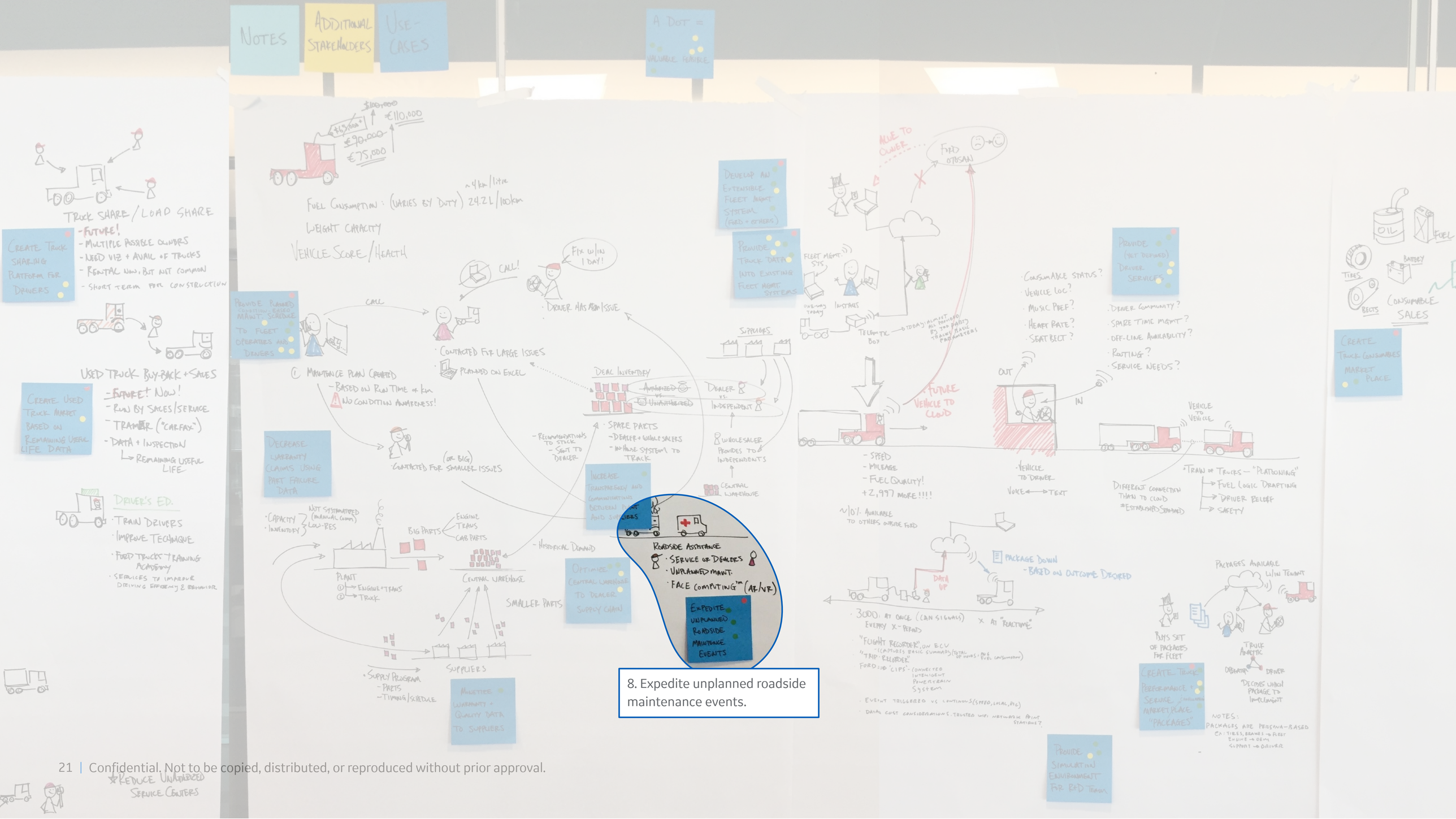


4. Create performance + services package marketplace.

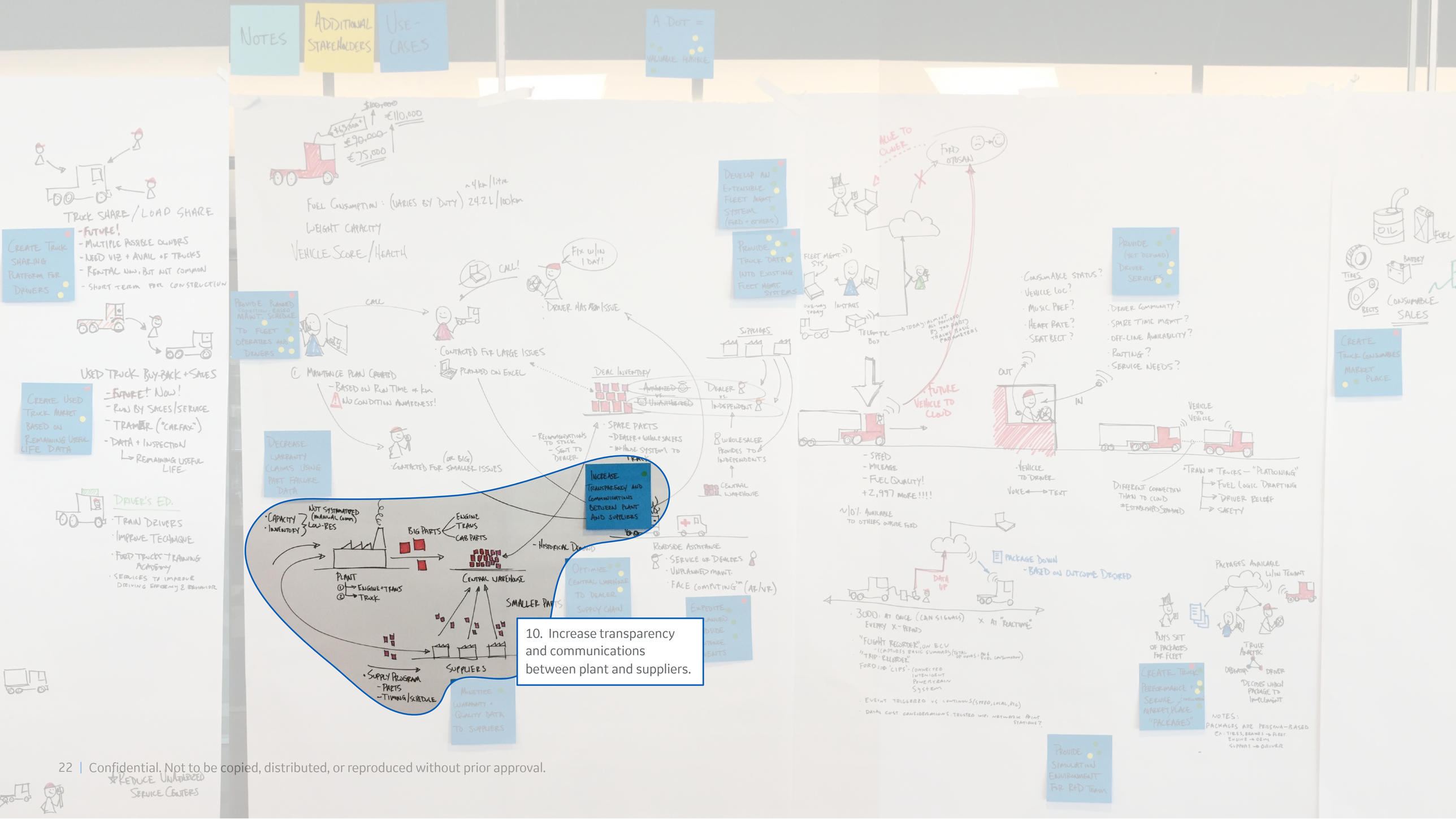

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5. Provide simulation environment for R&D team.
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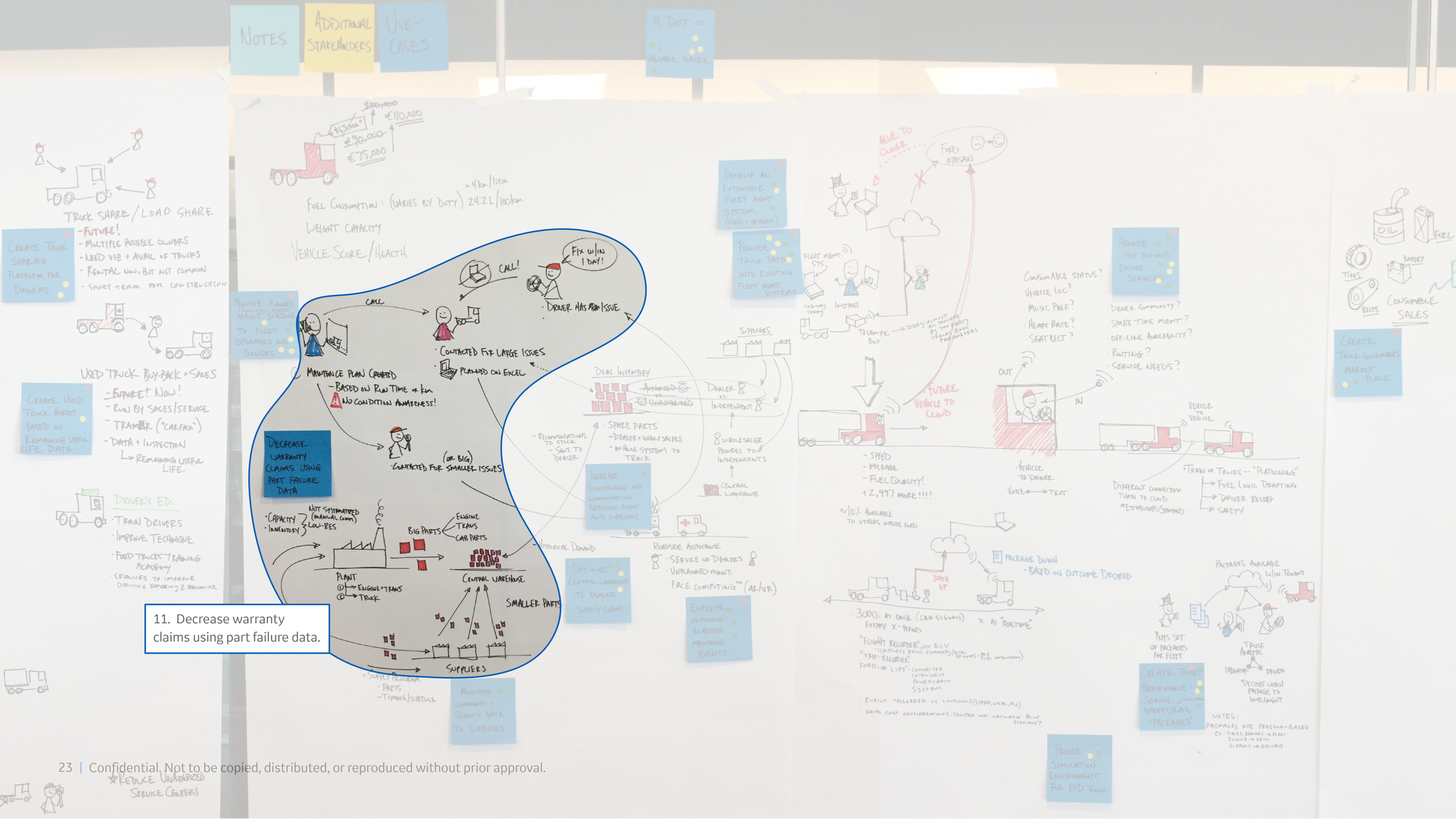

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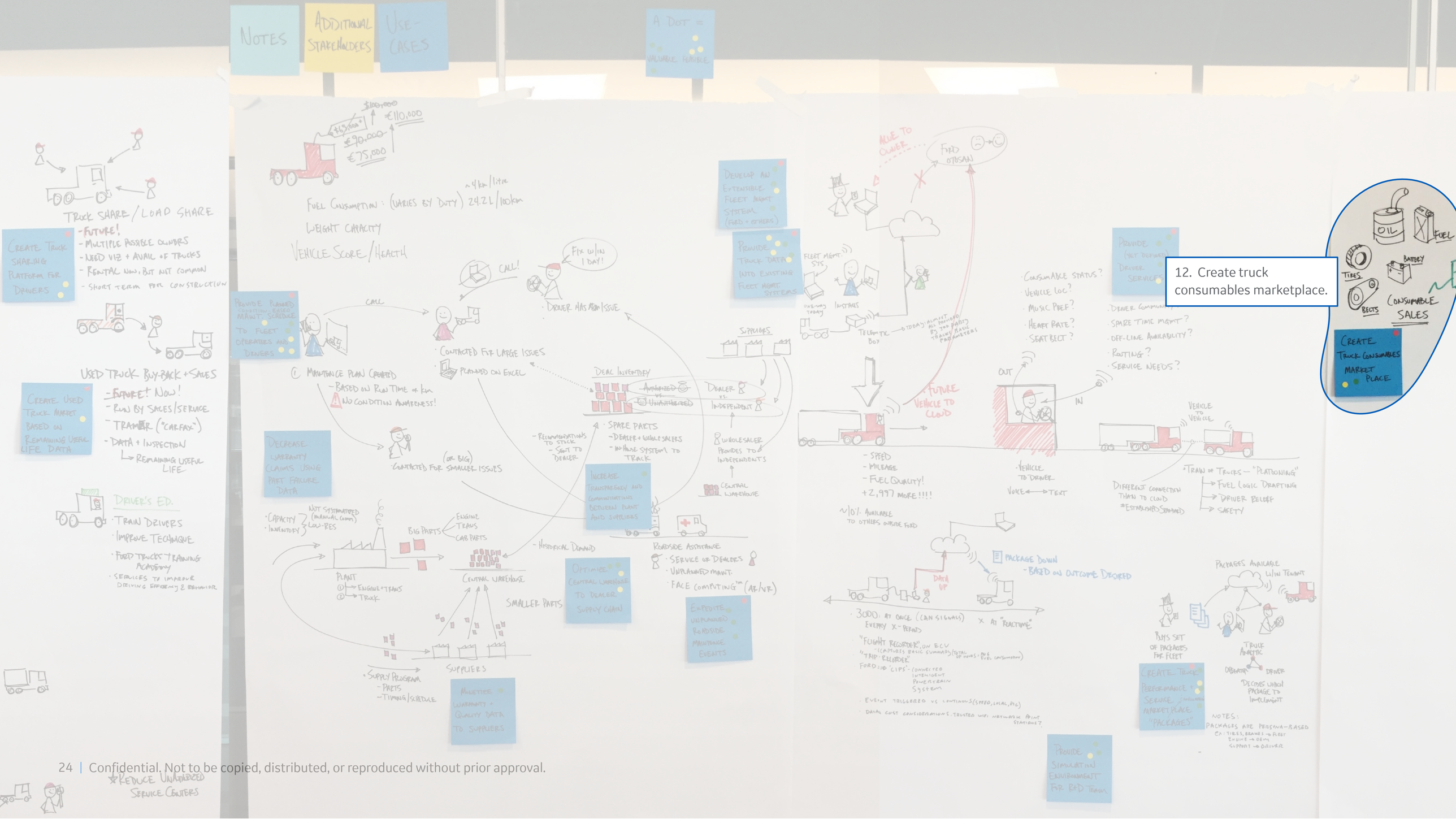


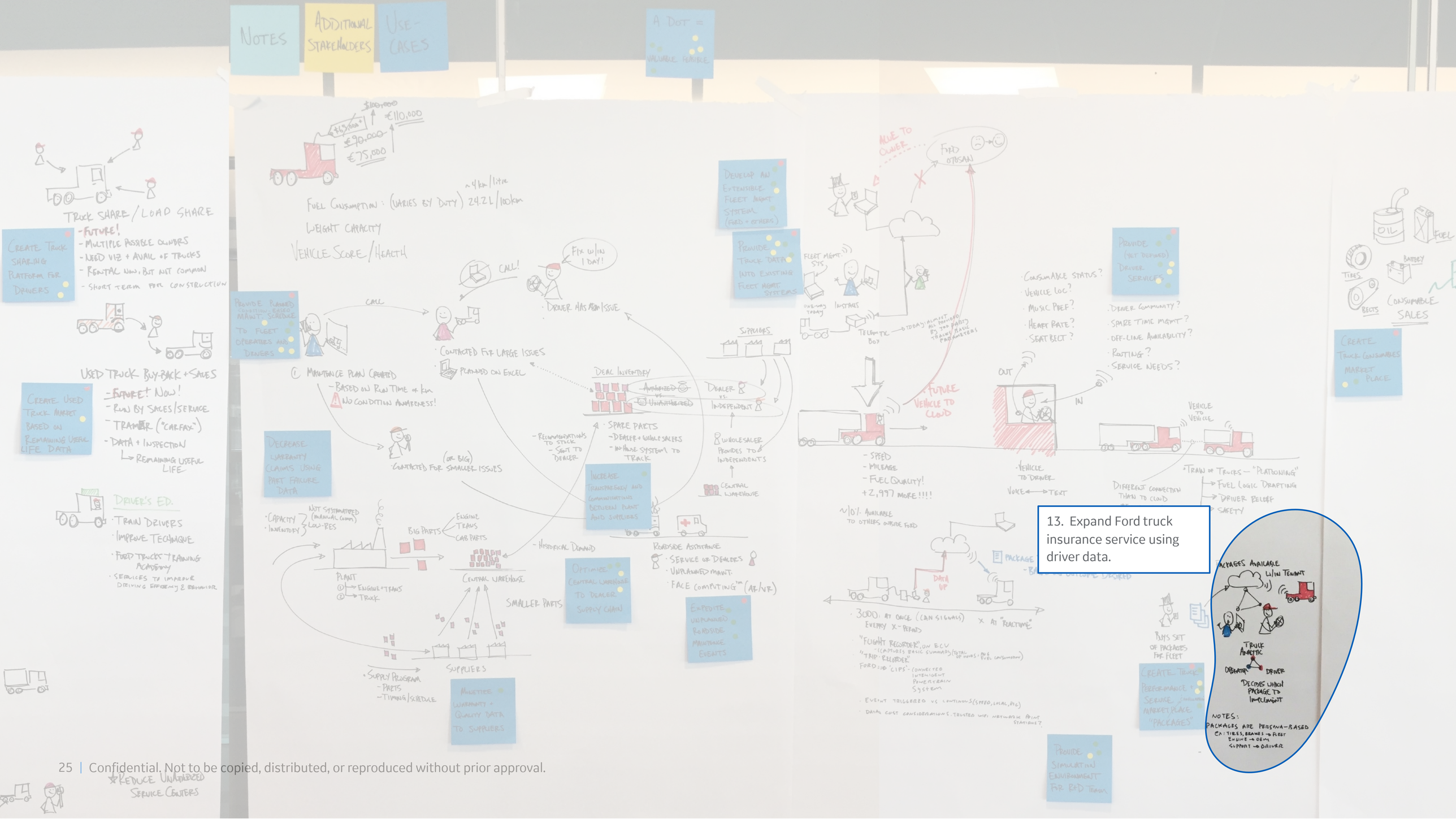
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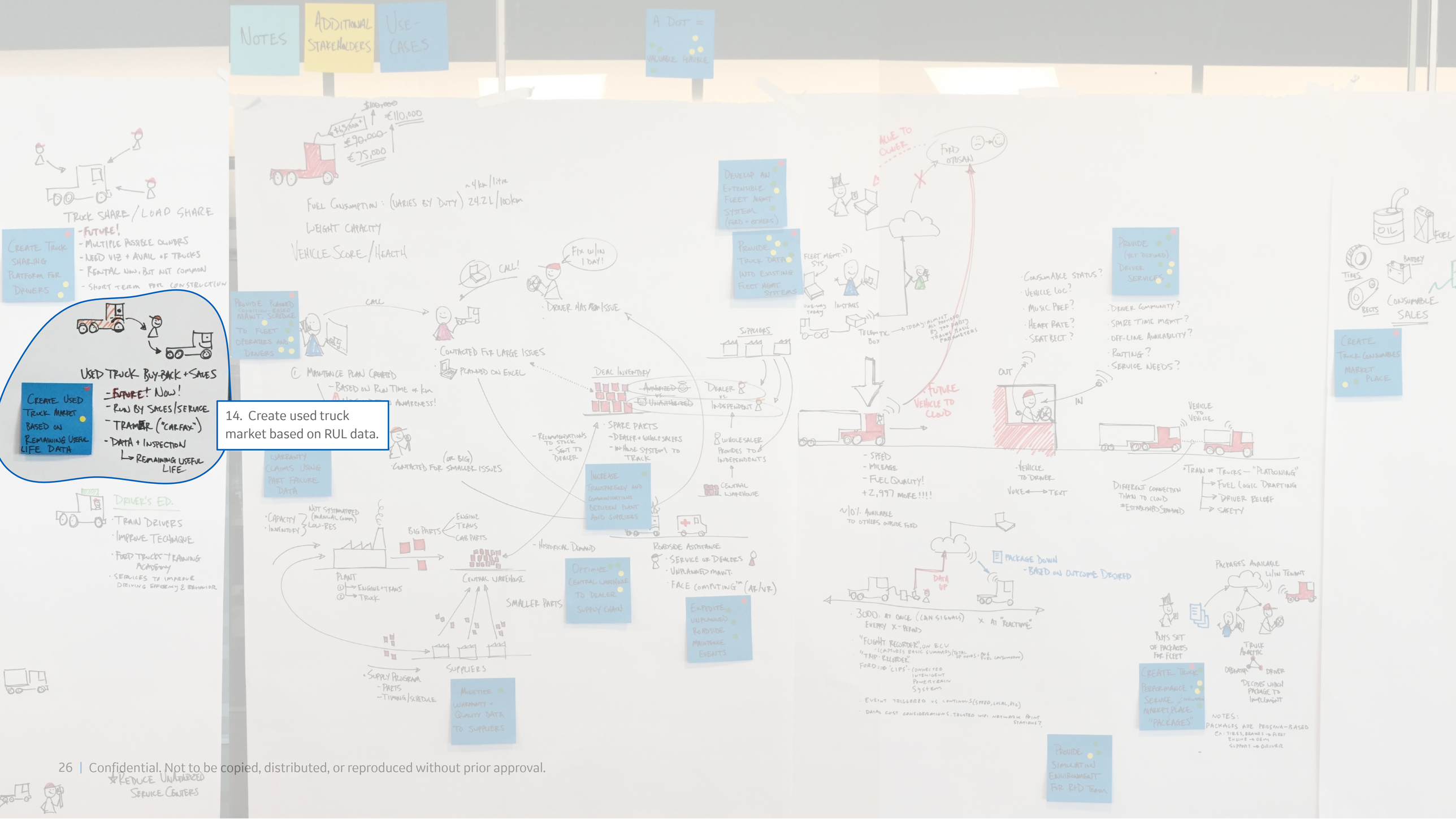

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SUPPLIERS
- RECOMMENDATIONS TO STOCK
- SENT TO DEALER
· SPARE PARTS
- DEALER + WHOLESALERS
- IN-HOUSE SYSTEM TO TRACK
WHOLESALER PROVIDES TO INDEPENDENTS
CENTRAL WAREHOUSE
INCREASE TRANSPARENCY AND COMMUNICATIONS BETWEEN PLANT AND SUPPLIERS
· CAPACITY
· INVENTORY
NOT SYSTEMATED (MANUAL COMM) LOW-RES
BIG PARTS
ENGINE
TRANS
CAB PARTS
PLANT
① ENGINE + TRANS
② TRUCK
CENTRAL WAREHOUSE
SMALLER PARTS
SUPPLIERS
· SUPPLY PROGRAM
- PARTS
- TIMING/SCHEDULE
- HISTORICAL DATA
ROADSIDE ASSISTANCE
· SERVICE OR DEALERS
· UNPLANNED MAINT.
· FACE COMPUTING™ (AR/VR)
OPTIMIZE CENTRAL WAREHOUSE TO DEALER SUPPLY CHAIN
EXPEDITE
MONETIZE WARRANTY + QUALITY DATA TO SUPPLIERS
10. Increase transparency and communications between plant and suppliers.
DEVELOP AN EXTENSIBLE FLEET MGMT SYSTEM (FORD + OTHERS)
PROVIDE TRUCK DATA INTO EXISTING FLEET MGMT SYSTEMS
ABLE TO CLONE
FORD OTOSAN
FLEET MGMT SYS
OWN-WAY TODAY
INSTALLS
TELEMATIC BOX
TODAY: ALMOST ALL REPORTED BY 3RD PARTY TRACKER MAGIC PARAMETERS
FUTURE VEHICLE TO CLOUD
- SPEED
- MILEAGE
- FUEL QUALITY!
+2,997 MORE!!!!
~10% AVAILABLE TO OTHERS OUTSIDE FORD
· CONSUMABLE STATUS?
· VEHICLE LOC?
· MUSIC PREF?
· HEART RATE?
· SEAT BELT?
OUT
IN
· VEHICLE TO DRIVER
VOICE ↔ TEXT
PROVIDE (NOT DEFINED) DRIVER SERVICES
· DRIVER COMMUNITY?
· SPARE TIME MGMT?
· OFF-LINE AVAILABILITY?
· ROUTING?
· SERVICE NEEDS?
VEHICLE TO VEHICLE
· TRAIN OF TRUCKS — "PLATOONING"
→ FUEL LOGIC DRAFTING
→ DRIVER RELIEF
→ SAFETY
DIFFERENT CONNECTION THAN TO CLOUD
*ESTABLISHED STANDARD
PACKAGE DOWN
- BASED ON OUTCOME DESIRED
DATA UP
· 3000+ AT ONCE (CAN SIGNALS) EVERY X-PERIOD
X AT "REALTIME"
"FLIGHT RECORDER" ON ECU
(CAPTURES BASIC SUMMARY (TOTAL # OF HOURS, AVG FUEL CONSUMPTION)
"TRIP RECORDER"
FORD ⇒ 'CIPS' (CONNECTED INTELLIGENT POWERTRAIN SYSTEM)
· EVENT TRIGGERED VS CONTINUOUS (SPEED, LATAL, ETC)
· DATA COST CONSIDERATIONS - TRUSTED WIFI NETWORK POINT STATIONS?
PACKAGES AVAILABLE W/IN TENANT
BUYS SET OF PACKAGES FOR FLEET
CREATE TRUCK PERFORMANCE + SERVICE CONSUMABLES MARKETPLACE "PACKAGES"
TRUCK ANALYTIC
OPERATOR
DRIVER
DECIDES WHICH PACKAGE TO IMPLEMENT
NOTES:
PACKAGES ARE PERSONA-BASED
EX: TIRES, BRAKES → FLEET
ENGINE → OEM
SUPPORT → DRIVER
PROVIDE SIMULATION ENVIRONMENT FOR R&D TEAM
OIL
FUEL
TIRES
BATTERY
BELTS
CONSUMABLE SALES
CREATE TRUCK CONSUMABLES MARKET PLACE
REDUCE UNAUTHORIZED SERVICE CENTERS

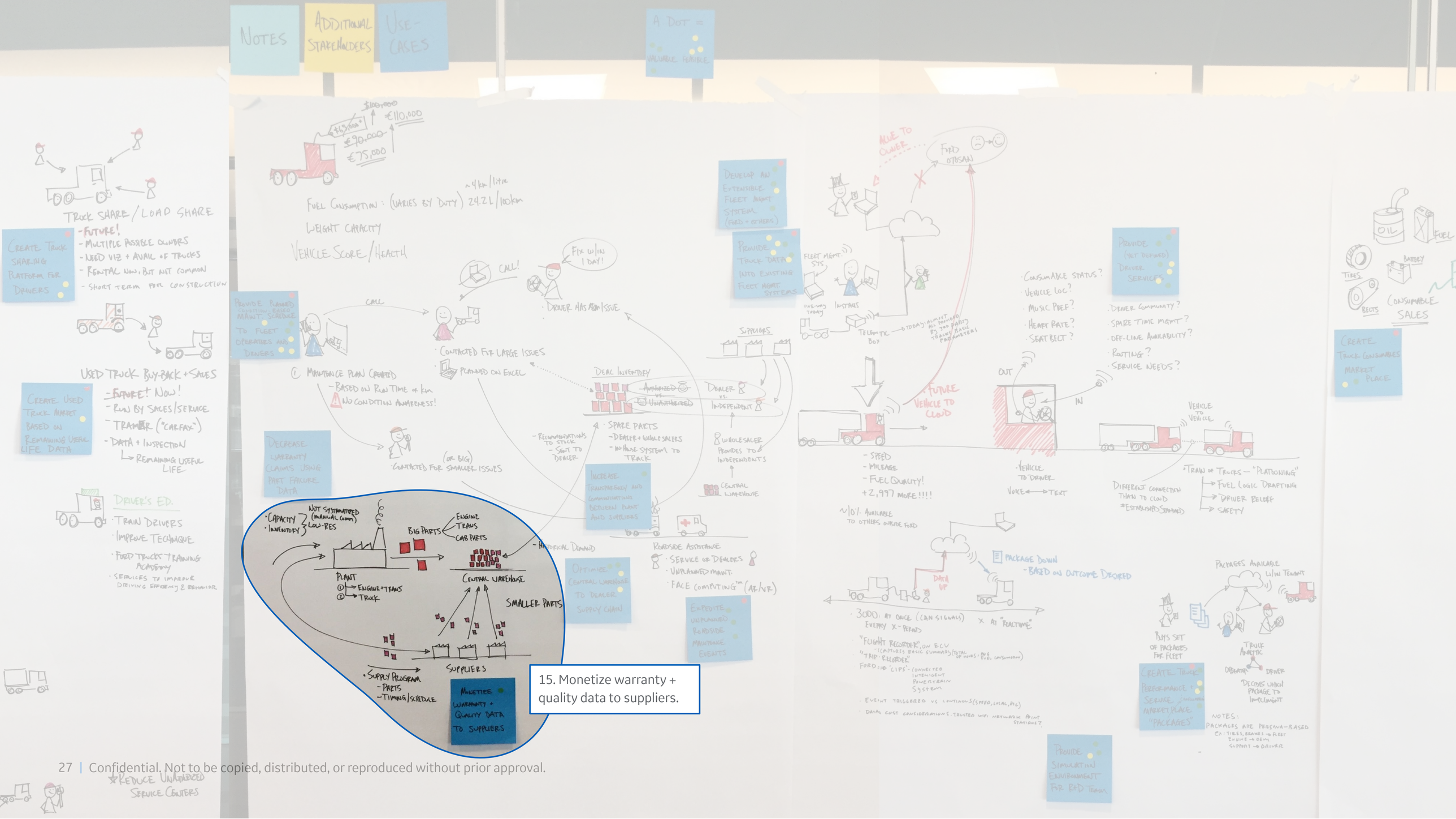


11. Decrease warranty claims using part failure data.


NOTES
ADDITIONAL STAKEHOLDERS
USE-CASES
A DOT =
VALUABLE FEASIBLE
TRUCK SHARE / LOAD SHARE
CREATE TRUCK SHARING PLATFORM FOR DRIVERS
-FUTURE!
- MULTIPLE PASSIVE OWNERS
- NEED VIZ + AVAIL OF TRUCKS
- RENTAL NOW, BUT NOT COMMON
- SHORT TERM FOR CONSTRUCTION
USED TRUCK BUY-BACK + SALES
CREATE USED TRUCK MARKET BASED ON REMAINING USEFUL LIFE DATA
-FUTURE! NOW!
- RUN BY SALES/SERVICE
- TRADFER ("CARFAX")
- DATA + INSPECTION
→ REMAINING USEFUL LIFE
DRIVER'S ED.
· TRAIN DRIVERS
· IMPROVE TECHNIQUE
· FORD TRUCKS TRAINING ACADEMY
· SERVICES TO IMPROVE DRIVING EFFICIENCY & BEHAVIOR
$100,000
$65,000
€110,000
€90,000
€75,000
FUEL CONSUMPTION: (VARIES BY DUTY) ~4km/litre 24.2L/100km
WEIGHT CAPACITY
VEHICLE SCORE/HEALTH
PROVIDE RUGGED CONDITIONS BASED MAINT. SCHEDULE TO FLEET OPERATORS AND DRIVERS
CALL
CALL!
FIX W/IN 1 DAY!
DRIVER HAS ISSUE
· CONTACTED FIX LARGE ISSUES
· PLANNED ON EXCEL
① MAINTENCE PLAN CREATED
- BASED ON RUN TIME or km
⚠ NO CONDITION AWARENESS!
· CONTACTED FOR (OR BIG) SMALLER ISSUES
DECREASE WARRANTY CLAIMS USING PART FAILURE DATA
DEAL INVENTORY
AUTHORIZED vs UNAUTHORIZED
DEALER vs. INDEPENDENT
· SPARE PARTS
-DEALER + WHOLESALERS
- IN-HOUSE SYSTEM TO TRACK
- RECOMMENDATIONS TO STOCK
- SENT TO DEALER
SUPPLIERS
WHOLESALER PROVIDES TO INDEPENDENTS
CENTRAL WAREHOUSE
INCREASE TRANSPARENCY AND COMMUNICATIONS BETWEEN PLANT AND SUPPLIERS
· CAPACITY
· INVENTORY
NOT SYSTEMATIZED (MANUAL COMM) LOW-RES
BIG PARTS
ENGINE
TRANS
CAB PARTS
- HISTORICAL DEMAND
PLANT
① ENGINE + TRANS
② TRUCK
CENTRAL WAREHOUSE
SMALLER PARTS
OPTIMIZE CENTRAL WAREHOUSE TO DEALER SUPPLY CHAIN
ROADSIDE ASSISTANCE
· SERVICE OR DEALERS
· UNPLANNED MAINT.
· FACE COMPUTING™ (AR/VR)
EXPEDITE UNPLANNED ROADSIDE MAINTENCE EVENTS
· SUPPLY PROGRAM
- PARTS
- TIMING/SCHEDULE
MONETIZE WARRANTY + QUALITY DATA TO SUPPLIERS
DEVELOP AN EXTENSIBLE FLEET MGMT SYSTEM (FORD + OTHERS)
PROVIDE TRUCK DATA INTO EXISTING FLEET MGMT SYSTEMS
ABLE TO CLAIM
FORD OTOSAN
FLEET MGMT SYS
OWN-WAY TODAY
INSTALLS
TELEMATIC BOX
TODAY: ALMOST ALL PROVIDED BY 3RD PARTY TRACKS MAGIC PARAMETERS
FUTURE VEHICLE TO CLOUD
- SPEED
- MILEAGE
- FUEL QUALITY!
+2,997 MORE!!!!
~10% AVAILABLE TO OTHERS OUTSIDE FORD
DATA UP
PACKAGE DOWN
- BASED ON OUTCOME DESIRED
· 3000+ AT ONCE (CAN SIGNALS) EVERY X-PERIOD
X AT "REALTIME"
"FLIGHT RECORDER" ON ECU
"TRIP RECORDER"
FORD :=D 'CIPS' (CONNECTED INTELLIGENT POWERTRAIN SYSTEM)
· EVENT TRIGGERED VS CONTINUOUS (SPEED, LOCAL, ETC)
· DATA COST CONSIDERATIONS - TRUSTED WIFI NETWORK POINT STATIONS?
PROVIDE (NOT DEFINED) DRIVER SERVICES
· CONSUMABLE STATUS?
· VEHICLE LOC?
· MUSIC PREF?
· HEART RATE?
· SEAT BELT?
OUT
IN
· VEHICLE TO DRIVER
VOICE ↔ TEXT
· DRIVER COMMUNITY
· SPARE TIME MGMT?
· OFF-LINE AVAILABILITY?
· ROUTING?
· SERVICE NEEDS?
VEHICLE TO VEHICLE
· TRAIN OF TRUCKS — "PLATOONING"
→ FUEL LOGIC DRAFTING
→ DRIVER RELIEF
→ SAFETY
DIFFERENT CONNECTION THAN TO CLOUD
*ESTABLISHED STANDARD
PACKAGES AVAILABLE W/IN TENANT
BUYS SET OF PACKAGES FOR FLEET
CREATE TRUCK PERFORMANCE + SERVICE CONSUMABLE MARKETPLACE "PACKAGES"
TRUCK ANALYTIC
OPERATOR
DRIVER
DECIDES WHICH PACKAGE TO IMPLEMENT
NOTES:
PACKAGES ARE PERSONA-BASED
EX: TIRES, BRAKES → FLEET
ENGINE → OEM
SUPPORT → DRIVER
PROVIDE SIMULATION ENVIRONMENT FOR R&D TEAM
OIL
FUEL
TIRES
BATTERY
BRAKES
CONSUMABLE SALES
CREATE TRUCK CONSUMABLES MARKET PLACE
12. Create truck consumables marketplace.
REDUCE UNAUTHORIZED SERVICE CENTERS


NOTES
ADDITIONAL STAKEHOLDERS
USE-CASES
A DOT = VALUABLE FEASIBLE
TRUCK SHARE / LOAD SHARE
- FUTURE!
- MULTIPLE PASSIVE OWNERS
- NEED VIZ + AVAIL OF TRUCKS
- RENTAL NOW, BUT NOT COMMON
- SHORT TERM FOR CONSTRUCTION
CREATE TRUCK SHARING PLATFORM FOR DRIVERS
USED TRUCK BUY-BACK + SALES
- FUTURE! NOW!
- RUN BY SALES/SERVICE
- TRADE-IN ("CARFAX")
- DATA + INSPECTION
→ REMAINING USEFUL LIFE
CREATE USED TRUCK MARKET BASED ON REMAINING USEFUL LIFE DATA
DRIVER'S ED.
- TRAIN DRIVERS
- IMPROVE TECHNIQUE
- FORD TRUCKS TRAINING ACADEMY
- SERVICES TO IMPROVE DRIVING EFFICIENCY & BEHAVIOR
$105,000
$65,000
$90,000
$75,000
€110,000
FUEL CONSUMPTION: (VARIES BY DUTY) ~4km/litre 24.2L/100km
WEIGHT CAPACITY
VEHICLE SCORE/HEALTH
PROVIDE PLANNED CONDITIONS BASED MAINT. SCHEDULE TO FLEET OPERATORS AND DRIVERS
CALL
CALL!
FIX W/IN 1 DAY!
DRIVER HAS ISSUE
CONTACTED FIX LARGE ISSUES
PLANNED ON EXCEL
1 MAINTENANCE PLAN CREATED
- BASED ON RUN TIME or km
NO CONDITION AWARENESS!
CONTACTED FOR SMALLER ISSUES (OR BIG)
DECREASE WARRANTY CLAIMS USING PART FAILURE DATA
DEAL INVENTORY
AUTHORIZED vs UNAUTHORIZED
DEALER vs INDEPENDENT
SUPPLIERS
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- IN-HOUSE SYSTEM TO TRACK
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BIG PARTS
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① ENGINE + TRANS
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CENTRAL WAREHOUSE
- HISTORICAL DEMAND
OPTIMIZE CENTRAL WAREHOUSE TO DEALER SUPPLY CHAIN
SMALLER PARTS
ROADSIDE ASSISTANCE
- SERVICE OR DEALERS
- UNPLANNED MAINT.
- FACE COMPUTING™ (AR/VR)
EXPEDITE UNPLANNED ROADSIDE MAINTENANCE EVENTS
- SUPPLY PROGRAM
- PARTS
- TIMING/SCHEDULE
MONETIZE WARRANTY + QUALITY DATA TO SUPPLIERS
DEVELOP AN EXTENSIBLE FLEET MGMT SYSTEM (FORD + OTHERS)
PROVIDE TRUCK DATA INTO EXISTING FLEET MGMT SYSTEMS
ABLE TO CLONE
FORD OTOSAN
FLEET MGMT SYS
OWN-WAY TODAY
INSTALLS
TELEMATIC BOX
TODAY: ALMOST ALL PROVIDED BY 3RD PARTY TRACKING MAGIC PARAMETERS
FUTURE VEHICLE TO CLOUD
- SPEED
- MILEAGE
- FUEL QUALITY!
+2,997 MORE!!!!
~10% AVAILABLE TO OTHERS OUTSIDE FORD
DATA UP
PACKAGE
- 3000+ AT ONCE (CAN SIGNALS) EVERY X-PERIOD
X AT "REALTIME"
"FLIGHT RECORDER" ON ECU (CAPTURES BASIC SUMMARY (TOTAL OF HOURS, KM, FUEL CONSUMPTION))
"TRIP RECORDER"
FORD => 'CIPS' (CONNECTED INTELLIGENT POWERTRAIN SYSTEM)
- EVENT TRIGGERED VS CONTINUOUS (SPEED, LATERAL, ETC)
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PROVIDE (NOT DEFINED) DRIVER SERVICES
- CONSUMABLE STATUS?
- VEHICLE LOC?
- MUSIC PREF?
- HEART RATE?
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- SPARE TIME MGMT?
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- ROUTING?
- SERVICE NEEDS?
OUT
IN
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VEHICLE TO VEHICLE
DIFFERENT CONNECTION THAN TO CLOUD
"TRAIN OF TRUCKS — "PLATOONING"
- FUEL LOGIC DRAFTING
- DRIVER RELIEF
- SAFETY
OIL
FUEL
TIRES
BATTERY
BRAKES
CONSUMABLE SALES
CREATE TRUCK CONSUMABLES MARKET PLACE
13. Expand Ford truck insurance service using driver data.
PACKAGES AVAILABLE W/IN TENANT
TRUCK ANALYTIC
OPERATOR
DRIVER
DECIDES WHICH PACKAGE TO IMPLEMENT
NOTES:
PACKAGES ARE PERSONA-BASED
EX: TIRES, BRAKES → FLEET
ENGINE → OEM
SUPPORT → DRIVER
BUYS SET OF PACKAGES FOR FLEET
CREATE TRUCK PERFORMANCE + SERVICE CONSUMER MARKETPLACE "PACKAGES"
PROVIDE SIMULATION ENVIRONMENT FOR R&D TEAM
REDUCE UNAUTHORIZED SERVICE CENTERS


NOTES
ADDITIONAL STAKEHOLDERS
USE-CASES
A DOT = VALUABLE FEASIBLE
TRUCK SHARE / LOAD SHARE
- FUTURE!
- MULTIPLE PASSIVE OWNERS
- USED VIZ + AVAIL OF TRUCKS
- RENTAL NOW, BUT NOT COMMON
- SHORT TERM FOR CONSTRUCTION
CREATE TRUCK SHARING PLATFORM FOR DRIVERS
USED TRUCK BUY-BACK + SALES
- FUTURE! NOW!
- RUN BY SALES/SERVICE
- TRAMER ("CARFAX")
- DATA + INSPECTION
→ REMAINING USEFUL LIFE
CREATE USED TRUCK MARKET BASED ON REMAINING USEFUL LIFE DATA
14. Create used truck market based on RUL data.
DRIVER'S ED.
- TRAIN DRIVERS
- IMPROVE TECHNIQUE
- FORD TRUCKS TRAINING ACADEMY
- SERVICES TO IMPROVE DRIVING EFFICIENCY & BEHAVIOR
REDUCE UNAUTHORIZED SERVICE CENTERS
FUEL CONSUMPTION: (VARIES BY DUTY) 24.2L/100km
~4km/litre
WEIGHT CAPACITY
VEHICLE SCORE/HEALTH
$65,000
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CALL
CALL!
FIX W/IN 1 DAY!
DRIVER HAS ISSUE
PROVIDE PLANNED CONDITIONS BASED MAINT. SCHEDULE TO FLEET OPERATORS AND DRIVERS
CONTACTED FIX LARGE ISSUES
PLANNED ON EXCEL
1. MAINTENANCE PLAN CREATED
- BASED ON RUN TIME or km
WARRANTY CLAIMS USING PART FAILURE DATA
CONTACTED FOR SMALLER ISSUES (OR BIG)
DEVELOP AN EXTENSIBLE FLEET MGMT SYSTEM (FORD + OTHERS)
PROVIDE TRUCK DATA INTO EXISTING FLEET MGMT SYSTEMS
FLEET MGMT SYS
OWN WAY TODAY
INSTALLS
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TODAY: ALMOST ALL PROVIDED BY 3RD PARTY TRACKS MAGIC PARAMETERS
ABLE TO CLEAR
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- SPEED
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CONSUMABLE STATUS?
VEHICLE LOC?
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VEHICLE TO DRIVER
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PROVIDE (NOT DEFINED) DRIVER SERVICES
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PACKAGES AVAILABLE W/IN TENANT
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CREATE TRUCK CONSUMABLES MARKETPLACE

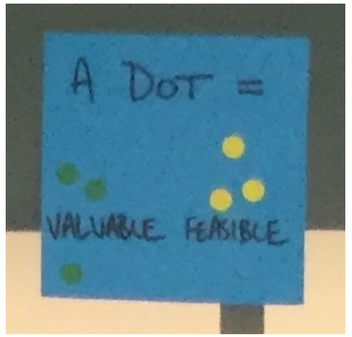

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FLEET MGMT. SYS
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CENTRAL WAREHOUSE
SMALLER PARTS
SUPPLIERS
· SUPPLY PROGRAM
- PARTS
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MONETIZE WARRANTY + QUALITY DATA TO SUPPLIERS
15. Monetize warranty + quality data to suppliers.
PROVIDE (NOT DEFINED) DRIVER SERVICES
· CONSUMABLE STATUS?
· VEHICLE LOC?
· MUSIC PREF?
· HEART RATE?
· SEAT BELT?
· DRIVER COMMUNITY?
· SPARE TIME MGMT?
· OFF-LINE AVAILABILITY?
· ROUTING?
· SERVICE NEEDS?
FUTURE VEHICLE TO CLOUD
- SPEED
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+2,997 MORE!!!!
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OUT
IN
· VEHICLE TO DRIVER
VOICE ↔ TEXT
VEHICLE TO VEHICLE
DIFFERENT CONNECTION THAN TO CLOUD
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PACKAGE DOWN
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PACKAGES AVAILABLE W/IN TENANT
BUYS SET OF PACKAGES FOR FLEET
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CONSUMABLE SALES
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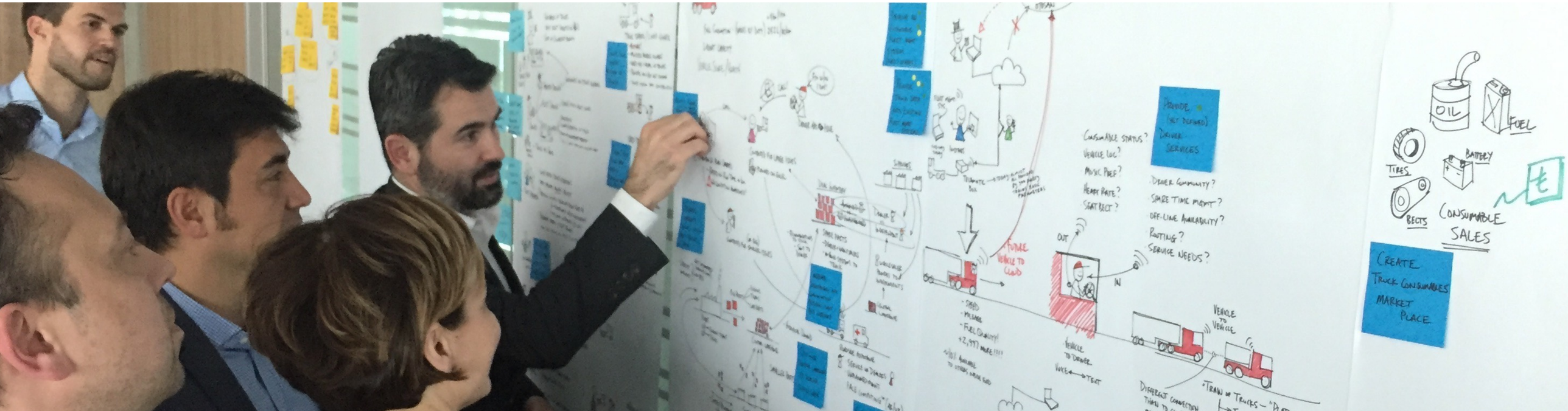
Prioritization

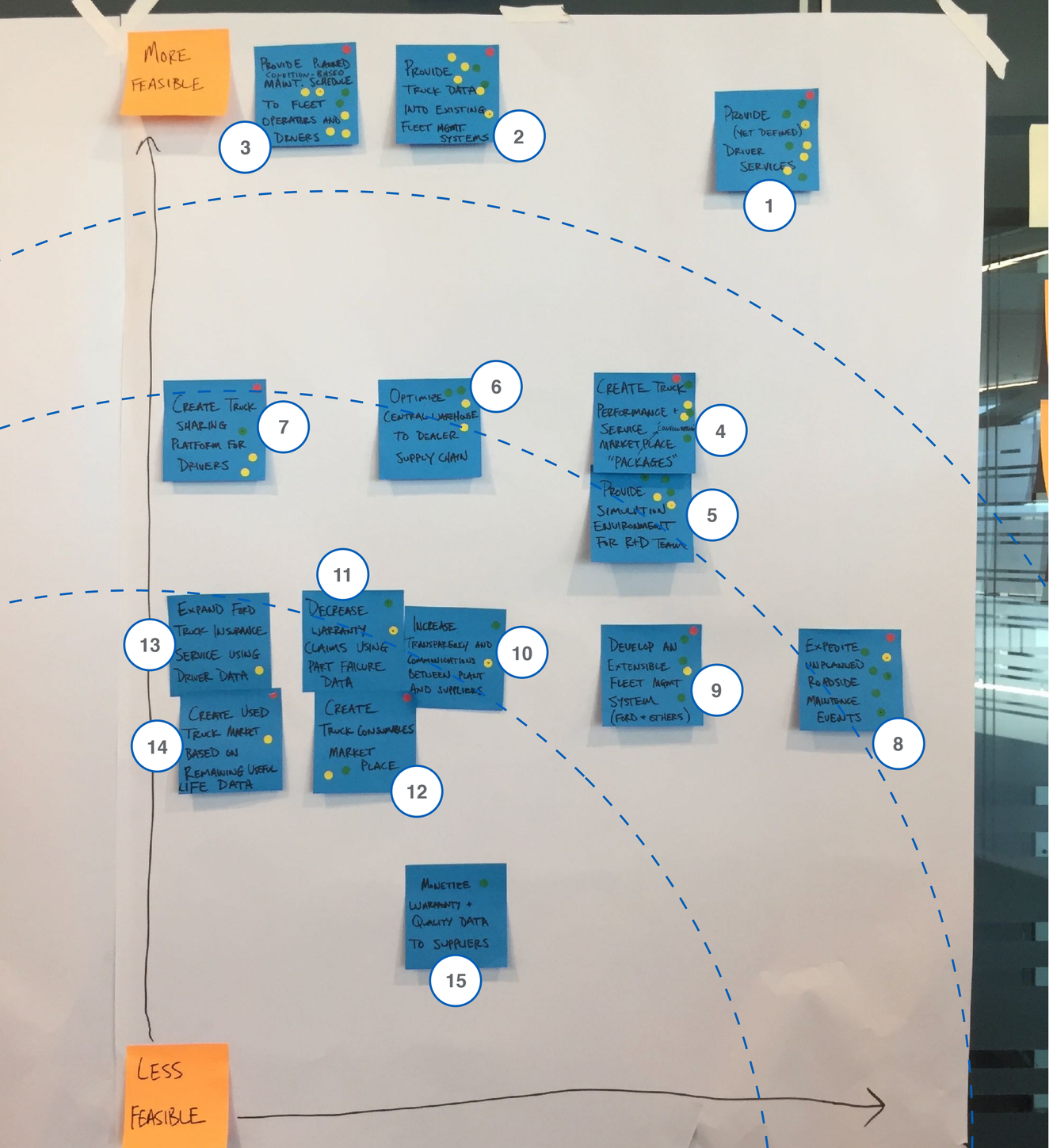
Dot-voting to determine order and focus.

After reviewing the outlined use-cases with the CDO's office, Marketing, and Powertrain teams, our goal was to find which of the use-cases carried the most potential. All participants were provided small sticky dots to use in voting for their preferred use-cases. The voting related to two different meanings, with a different color for either meaning:
Green = Valuable, Yellow = Feasible, Red = Customer Facing

Each member of the Ford Otosan team were provided 4 dots of each color, and the GE team were provided 2 dots of each color. Consideration and discussion ensued as everyone placed their vote.

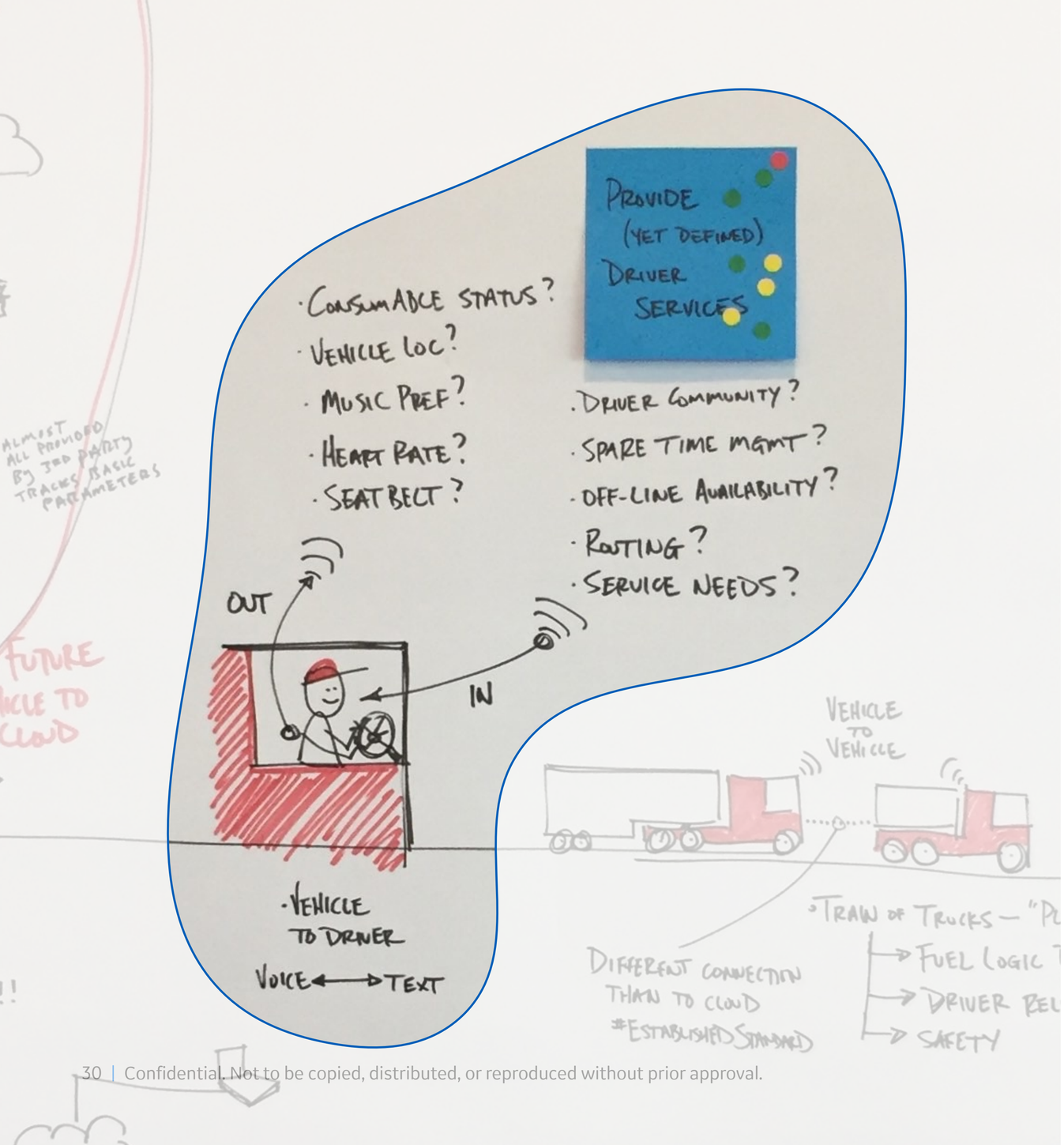






Prioritization

1. Provide driver services.
2. Provide truck data into existing fleet mgmt systems.
3. Provide condition-based maintenance to fleet operators.
4. Create performance + services package marketplace.
5. Provide simulation environment for R&D team.
6. Optimize supply chain from central warehouse to dealer.
7. Create truck sharing platform for drivers.
8. Expedite unplanned roadside maintenance events.
9. Develop an extensible fleet mgmt system (Ford + others).
10. Increase transparency and communications between plant and suppliers.
11. Decrease warranty claims using part failure data.
12. Create truck consumables marketplace.
13. Expand Ford truck insurance service using driver data.
14. Create used truck market based on RUL data.
15. Monetize warranty + quality data to suppliers.



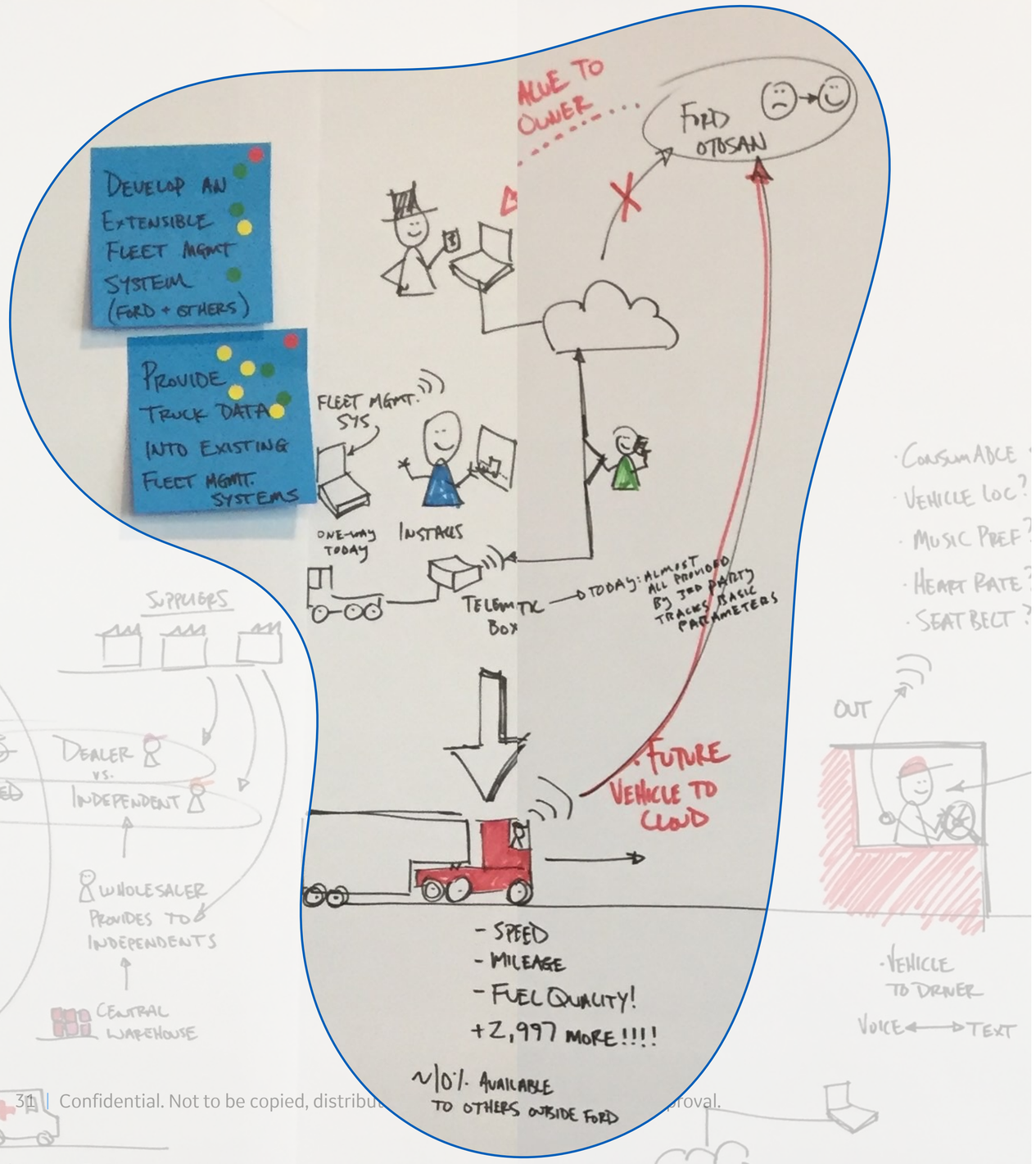
Use-Case

1. Provide driver services.

Providing innovative services to drivers is seen as both highly valuable and relatively feasible. By collecting data about behavior, personalizations, and vehicle use, it is believed that the derived services could differentiate Ford Otosan from competitors and create brand preference. These services will evolve in capability as adjacent initiatives collect truck data and create value for Fleet Operators and Owners.

Challenges:

- Recruiting drivers for pre-design research.
- Understanding current market of driver services.
- Determining valuable driver-centric data to collect.
- Structuring monetization and business plan.
- Strategically associating roadmap of driver services to broader set of Ford Otosan solutions.



Use-Case

2. Provide truck data into existing fleet management systems.

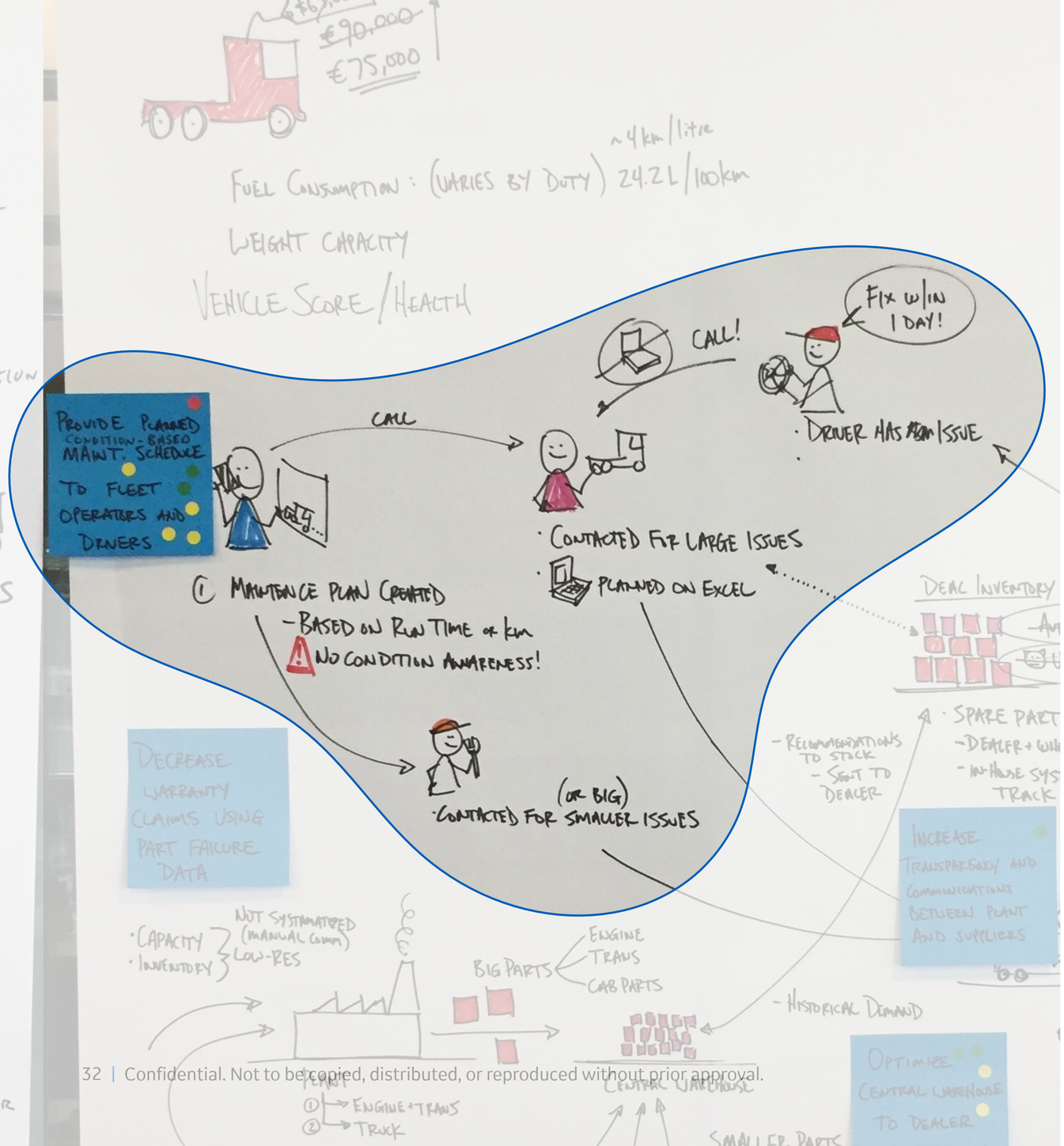
A fleet operator commonly has multiple types of vehicle manufacturers, models and product families, so they usually maintain their fleet via a single Fleet Management System, which carries a high change over cost.

Given this strong resistance to change, it is most strategic for Ford Otosan, as an OEM, to provide any additional differentiating analytics packages as features, or integrations into market leading Fleet Management Systems, versus building their own.

Knowing most about its own truck diagnostics, Ford stands in a position to add new value streams, via existing technology channels, such as Fleet Management Systems.

Additionally, Fleet Management Systems today are usually ‘one directional’, so there is room to open up interactions from drivers back into the main system of record.

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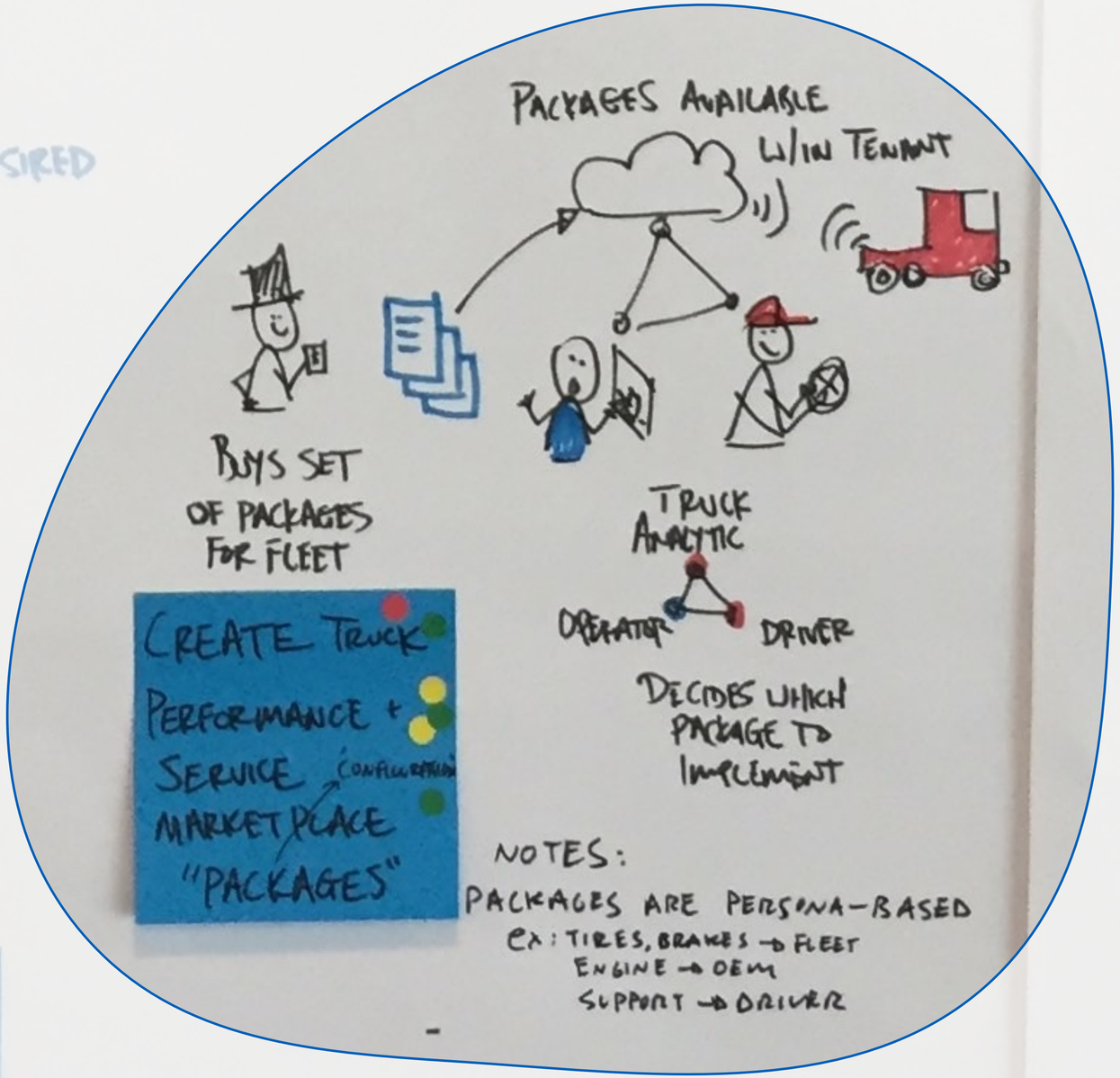
Use-Case

3. Provide condition-based maintenance to fleet operators.

By having predictive maintanence solutions on critical vehicle components (i.e., Diesel Engine, Power Train), Ford Otosan as an OEM can monitor and provide condition-based maintenance services to fleet operators or drivers.

Today, maintanence and service planning is done based of time or mileage, and by moving to condition-based maintanence planning, planning can be far more prescriptive vs reactive.

This can also help service centers improve capacity planning and better forecast incoming maintenance work, which could be requested the day of, via phone, from drivers. Ford is striving to have a 24 hour service SLA.



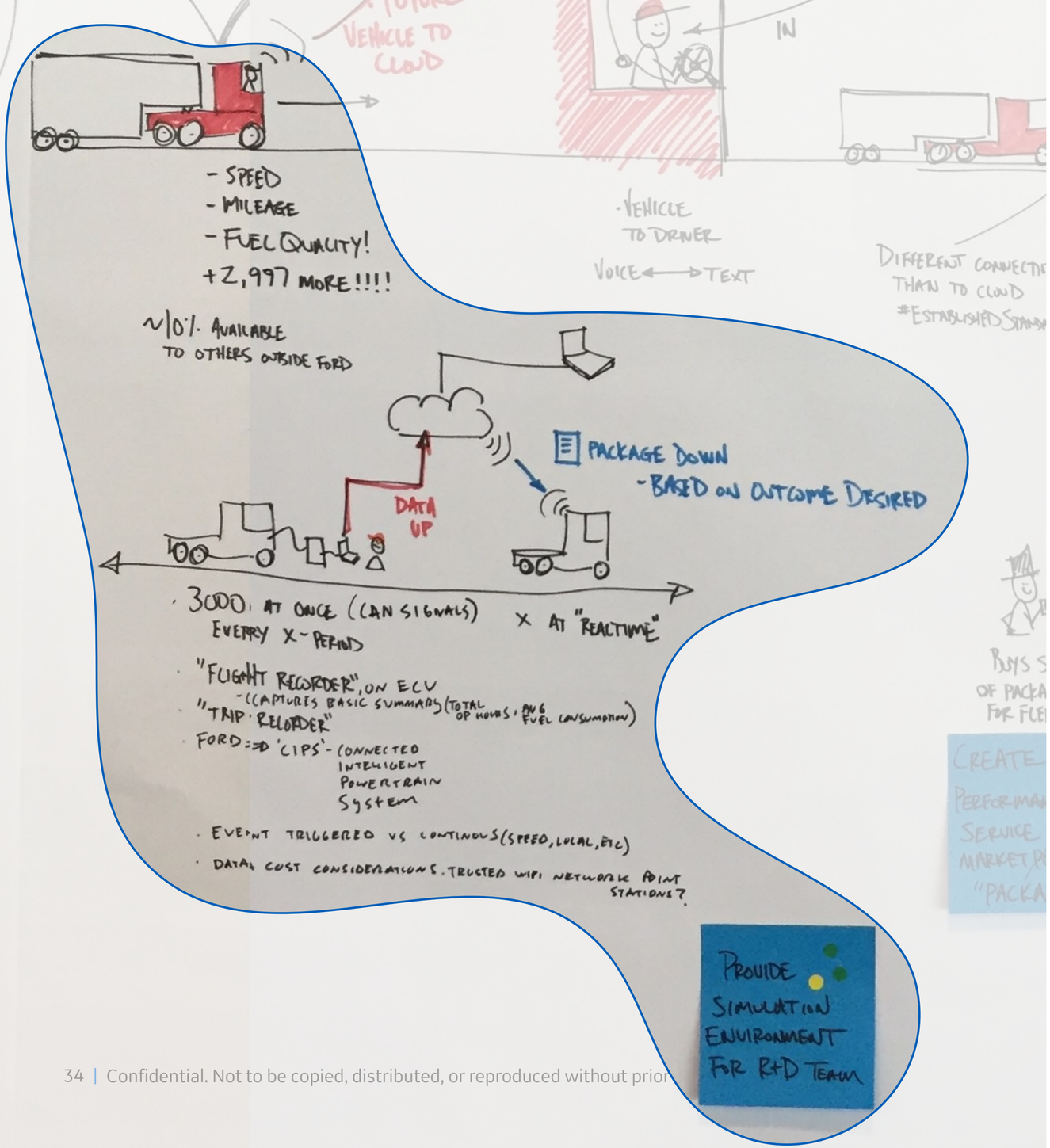
Use-Case

4. Create performance + services package marketplace.

As big truck data is collected and analyzed, there is an opportunity to define truck performance + service packages sold to fleet owners based on their operational needs. These packages would provide software-tuned capabilities that could be installed by the operator and/or driver as informed by the current context and job to be done. With a distributed architecture including mobile driver services, Predix Machine, and Predix Cloud, these packages could operate locally at the truck or across the fleet based on aggregate data.

Persona-Based Package Examples:

- Support for long haul drivers keeping them connected with local certified service in case of an emergency.
- Fuel quality monitoring package for operators in regions known for substandard fuel quality.
- Total cost of fleet maintenance package for owners to understand consumption of tires, brakes, labor, etc and potential cost-saving alternatives.



Use-Case

5. Provide simulation environment for R&D team.

Although an internally facing use case for the R&D team, creating a simulation environment to test analytics is a critical factor.

As more vehicles become connected, and more data parameters are collected and transmitted, the Product Development team is seeking a scalable technical environment to run scenarios to determine patterns and correlations with product design and lifecycle performance.

A simulation environment can help identify changes that need to occur across the vehicle lifecycle, such as changes to a part design, supplier relationship or warranty plans.

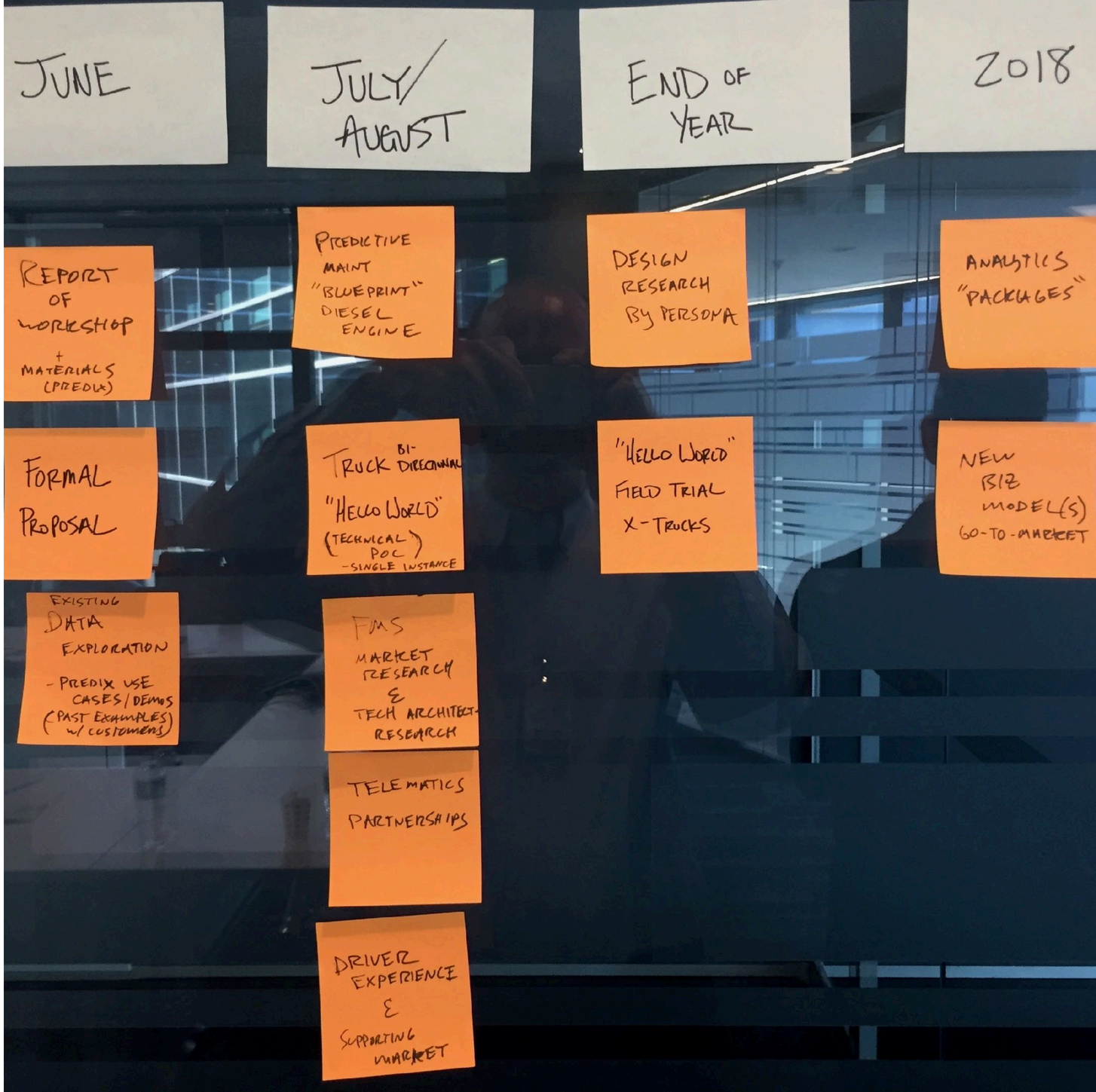
Next Steps

June
- Report of workshop & Predix materials
- Existing data exploration
- Predix use-cases & past customer examples

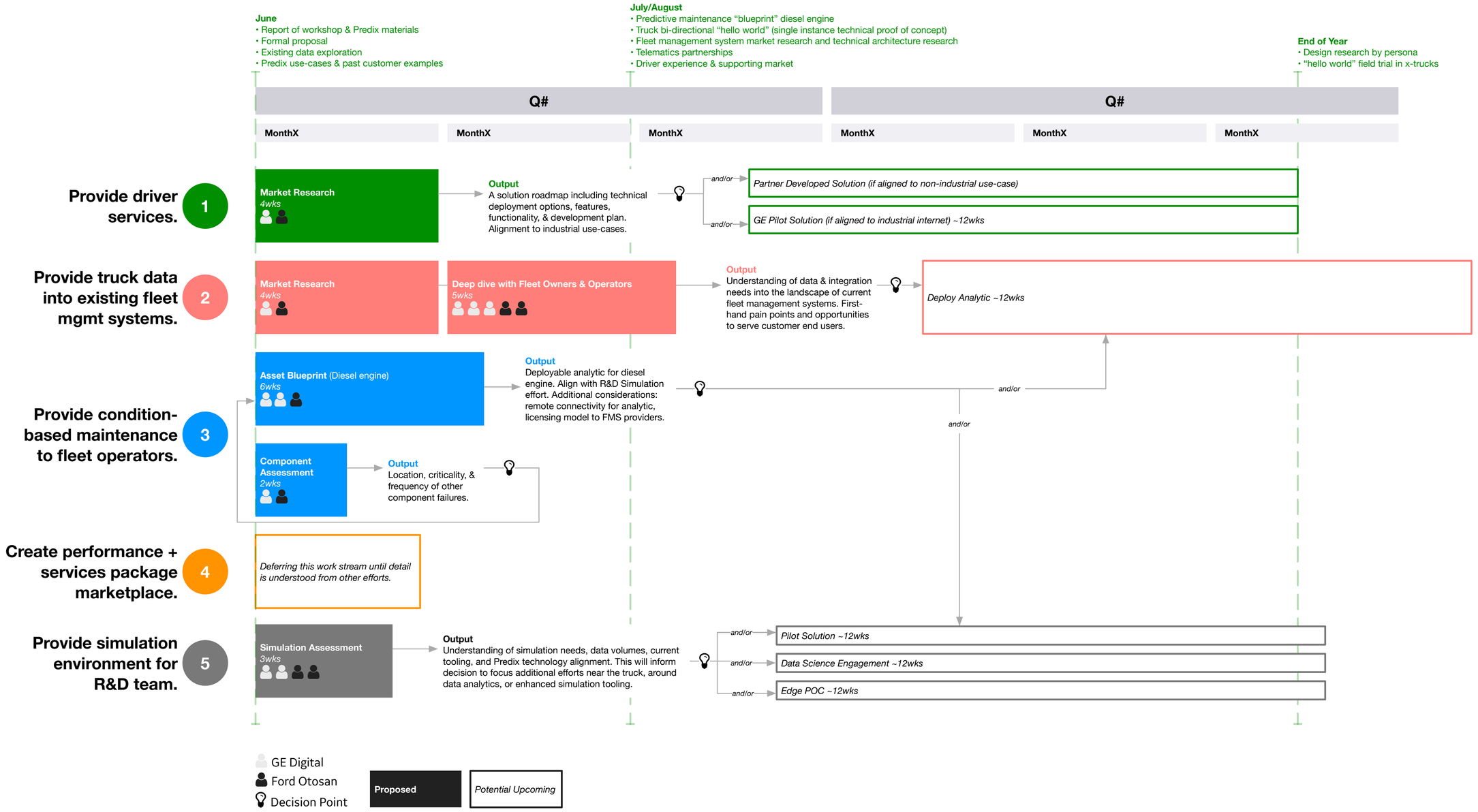
July/August
- Formalize high level proposal (see next slide)
  - Predictive maintenance “blueprint” diesel engine
  - Truck bi-directional “hello world” (single instance technical proof of concept)
  - Fleet management system market research and technical architecture research
  - Telematics partnerships
  - Driver experience & supporting market

End of Year
- Design research by persona
- “hello world” field trial in x-trucks

2018
- Analytics “packages”



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June
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• Formal proposal
• Existing data exploration
• Predix use-cases & past customer examples
July/August
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End of Year
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• "hello world" field trial in x-trucks
Q#
Q#
MonthX
MonthX
MonthX
MonthX
MonthX
MonthX
Provide driver services.
1
Market Research
4wks
Output
A solution roadmap including technical deployment options, features, functionality, & development plan. Alignment to industrial use-cases.
and/or
Partner Developed Solution (if aligned to non-industrial use-case)
and/or
GE Pilot Solution (if aligned to industrial internet) ~12wks
Provide truck data into existing fleet mgmt systems.
2
Market Research
4wks
Deep dive with Fleet Owners & Operators
5wks
Output
Understanding of data & integration needs into the landscape of current fleet management systems. First-hand pain points and opportunities to serve customer end users.
Deploy Analytic ~12wks
Provide condition-based maintenance to fleet operators.
3
Asset Blueprint (Diesel engine)
6wks
Output
Deployable analytic for diesel engine. Align with R&D Simulation effort. Additional considerations: remote connectivity for analytic, licensing model to FMS providers.
and/or
and/or
Component Assessment
2wks
Output
Location, criticality, & frequency of other component failures.
Create performance + services package marketplace.
4
Deferring this work stream until detail is understood from other efforts.
Provide simulation environment for R&D team.
5
Simulation Assessment
3wks
Output
Understanding of simulation needs, data volumes, current tooling, and Predix technology alignment. This will inform decision to focus additional efforts near the truck, around data analytics, or enhanced simulation tooling.
and/or
Pilot Solution ~12wks
and/or
Data Science Engagement ~12wks
and/or
Edge POC ~12wks
GE Digital
Ford Otosan
Decision Point
Proposed
Potential Upcoming

High-level plan

Path Forward

Near Term (Q3-Q4, 2017)

'Ground Work'
Align resources, solidify work streams, agree on value, define SoW and finalize proposal

Accelerate Dig Transformation
Determine how to integrate best technologies and legacy applications in Manufacturing

Kickoff strategic pilots in New Business workstream
Accelerate time to market by leveraging existing technologies across both companies

Build Industrial IoT Practice

Mid Term (2018)

Scale
Move to full scale production systems

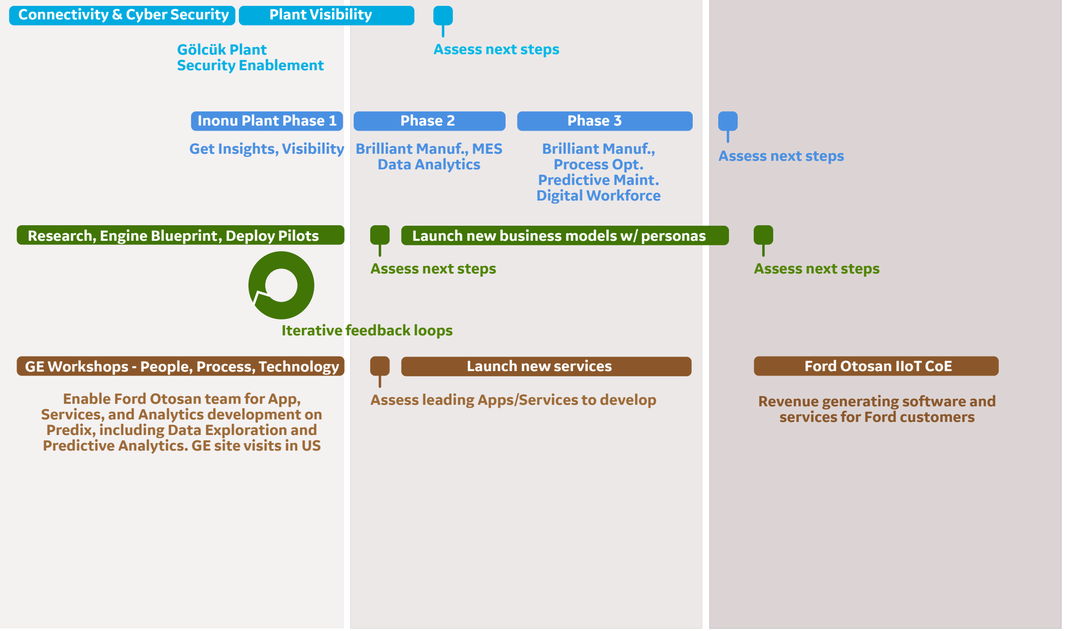
Pilot to Fleet Customers (B2B)
Provide unique value proposition through analytics packages, lower fleet owner cost of ownership, offer new services for fleet operators/ drivers

Long Term (2019 & Beyond)

Integrated value chain
Identify how valuable outcomes across work streams can increase efficiencies across various functions and value chains.

Expand
Expand analytics packages to new customer segments (consumer vehicles) and explore connected vehicle concepts (truck sharing, autonomous strategies, etc)

Workstreams



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