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WA RUC PILOT PROJECT OPERATIONAL FINDINGS

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WA RUC

WA RUC Operational Findings

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This paper provides operational findings from the WA RUC Pilot Project that are not included in other sections of the Pilot Project report. For example, lessons learned about Department of Licensing Subagents, Interoperability, and other topics, are covered in specific sections or appendices of the report. This paper includes Operational Findings from the WA RUC pilot on the following three topics.

I. Invoices
II. Odometer Reporting
III. Participant Management, RUC Data Collection and Reconciliation

I. Invoice Operational Findings and Recommendations

Monthly RUC Invoices were the primary means by which Road Usage Information was regularly communicated to participants.

The testing team noted the following challenges with invoices during WA RUC pilot operations. A potential solution for each challenge is included in the discussion.

1. **Service Providers interpreted Business Rules differently.** Business Rules were used as specifications of invoice content and appearance, so the different interpretations by Service Providers resulted in different appearing invoices. For example, service providers interpreted rounding rules, charts, time stamps, cut-off dates, and the means of reporting mileage reporting methods differently. To fix these differing interpretations by service providers, any element of an invoice should be specified very precisely.
2. **No single invoice layout satisfied all user categories.** Each mileage reporting methods had different invoice requirements, as did users who had multiple vehicles and users who switched mileage reporting methods. One service provider, DriveSync, observed during pilot operations that the majority of participants preferred to have summary of their invoice on the first page and detailed information on the next pages. To deal with this situation, it is advisable to start each Invoice with a summary, and then have sections on each vehicle, customized to its current mileage reporting method.
3. **Service providers did not precisely comprehend chart specifications** included in the business rules. That resulted in several chart corrections after implementation. To prevent this from recurring, chart specifications should be written more precisely, and invoice designs should be thoroughly tested early in the project.

To fix these challenges and more, the testing team learned a number of important lessons relevant for invoicing in future RUC systems

1. **Plan invoice specifications earlier and more formally**, by doing the following:

- Hold detailed discussions or a workshop on invoices to discuss business rules and lay-out for invoices. Include user-centric design principles and hire a design firm to help with invoice layout.
- Start invoice design review earlier**.** First, work with state agencies on a low fidelity design to test with end-user acceptance. Then iterate, i.e., based on the end user feedback on each version of the invoice, build complexity and then refine invoices with end user feedback over a period of months, before the system is in live revenue operations.
- Employ invoice layouts designed specifically for the primary user types. User types/invoices vary by mileage reporting method, number of vehicles, and whether a vehicle is electric or not. Include variable message boxes, so each invoice can include a customized message. These templates should be included from the start of the project. It was difficult to change the template once the project was launched as everything was designed with one template in mind.
- Clearly define business rules for charts. Define them so precisely that they cannot be subject to misinterpretation, though not so prescriptively as to limit Service Provider creativity.

2. **Improve invoice data processing through more comprehensive specifications,** by doing the following**:**
   - Define rules for vehicle enrollment date and mileage report capture date precisely. Define reference date to start accepting mileage reports. Account management system and mileage reporting system should have same time reference so service provider systems do not have to manage exceptions due to conflicting time/date information (For example, reception of first mileage report before account creation date, and vehicle cancellation and vehicle enrollment on the same day).
   - Define invoicing period and cut-off dates precisely. Clarify which transactions to include in the monthly and quarterly invoices (e.g. participants who begin at the middle of an invoicing period, or participants who switch mileage reporting methods and move from monthly to quarterly cycle. These participants receive a single quarterly invoice covering the monthly mileage reporting method transactions and quarterly mileage reporting methods transactions. A single invoicing period is indicated on the invoice header). Also, clarify cut-off dates and time (UTC dates vs Local Pacific Time difference) especially for mileage reporting methods based on odometer readings. Invoices had to be corrected to consider odometer readings submitted before 12 am PT (local time) and not UTC.

3. **Increase invoice standardization across Service Providers.** In the WA RUC Pilot, service providers applied different rules based on different interpretations and system capabilities, specifically on when to issue invoices and on mileage and dollar rounding. Emovis issued one invoice per vehicle, and only issued invoices when there was driving activity in a given period. Also, emovis only issued single receipts for mileage permits and no subsequent periodic invoices. By contrast, DriveSync issued a single (combined) invoice per participant showing multiple vehicles and issued invoices for all mileage

reporting methods even if there was no driving activity. Further, the two service providers applied different rounding rules—DriveSync rounded at the transaction level, and emovis rounded at the invoicing level. Thus:

- Specify when and how invoices should be issued. Ideally, issue invoices every period, regardless of activity, and require combined (multi-vehicle) invoices be issued to multi-vehicle accounts.
- Cover all exceptional cases for which invoices should be generated and specify exact timing (e.g. final invoices after vehicle change, mileage reporting method change, account closure)
- Specify rounding rules. Ideally, leave all transactions unrounded, and require rounding only at the invoice level.

4. **Improve invoicing dry runs**. The testing team held invoicing dry runs each month, in which the testing team reviewed invoices of both service providers to catch any potential errors. These dry runs were vital to ensuring quality invoices. The following two new requirements would have made the Dry Run process smoother, but would have required significant development effort by service providers, so were not implemented during the WA RUC pilot:
   - Require invoice generation and invoice delivery to be separate processes on service provider systems in order to ensure smooth dry runs. This would allow the testing team to see the actual invoices that would be received by participants, and prevent dry runs from leading to transmittal of erroneous email notifications.
   - Require service providers to support invoice transmittal email contents that vary based on user profile. Having different transmittal email contents (instead of the same content for all participants) would have allowed payment demonstration participants to know that they actually had to pay their invoices, and allow an extra reminder message for participants who were noncompliant for a given reporting period.

5. **Ensure closed vehicles are not included on invoices.** Once a vehicle is removed from the pilot, one final invoice should be issued for the vehicle and then all information on that vehicle should be removed from future invoices.

Finally, the tested team determined a recommendation that should be implemented when scaling up to a large-scale operational system—one that includes 100,000 or more participants. In that case, the system should use rolling invoicing (not tied to calendar month, with different participants receiving invoices on different days. Doing so will ease load management (DS team had activity peaks focused on 1-2 days), and eliminate issues resulting from cut-off time/day and invoicing periods.

II. Odometer Reporting Operational Findings and Recommendations

Issues with odometer reporting were the most frequent participant-reported issues in the pilot. These issues included both the image capture process and the notifications to participants to

complete the image capture process. Thus, improving the odometer reporting process would bring a significant improvement to the overall user experience of any RUC program that includes odometer reporting.

Participant complaints about odometer reporting during the WA RUC pilot included the following:

- Erroneous reminders
- Glitches with photo submission
- Reminders being too frequent
- Reminders coming too early
- Stress of having to report before travel away from vehicle
- Lack of acknowledgement that odometer picture was received
- Difficulty finding odometer readings submitted on online account
- Confusion on odometer reporting after a change of mileage reporting method

Beyond these complaints, the following sources of error / issues with odometer reading were observed during the pilot:

1. **Lack of strict separation between testing and production environments**. Lack of strict separation between test and live environments caused erroneous reminders to be sent. To fix this source of error, there should be strict separation between test and live environments.
2. **Imperfect operational processes**. Specifically, there were inconsistent manual overrides of odometer reading notifications (e.g., manual suppression of notifications), and there were coordination issues between notification sources (service provider, smartphone app vendor) and channels (emails, texts, service provider app, app used by DOL subagents, smartphone app). To fix these processes, manual overrides should be fully tested; and all notifications should be fully coordinated between notifier sources.
3. **Technical issues with odometer processing system.** Specifically, there were communication issues between odometer photo capture software (including app used by DOL subagents) and odometer photo processing system, leading to some odometer photos not being received and processed.
4. **Technical issues between vendor systems.** There was a relatively long processing time of odometer photos causing some odometer readings to be stuck between the odometer photo processing system and the service provider system.

To fix these challenges and more, the testing team learned a number of important lessons relevant for odometer reporting in future RUC systems:

1. **The first notification to send in an odometer image should be made as soon as the account is created**. The request that the user send in the initial odometer image should be made as soon as the user completes account creation, instead of 24 hours or more later.

2. **Odometer readings should be included on invoices and the web portal.** Display at least two odometer readings on invoices (first and last). Make submitted odometer images available on the web portal.
3. **Always send an acknowledgement email or text following odometer image submission.** The acknowledgement should include a link to the odometer image on the online account, if possible.
4. **Optimize timing/frequency of notifications.** Adjust frequencies and chose a reporting window for odometer readings based on user feedback. Not all users will be satisfied—some will want more, and some fewer reminders. If possible, allow users to customize timing/frequency of notifications. Note that in an operational system, the threat of penalties will encourage compliance in a way that cannot be achieved in pilots.
5. **Allow participants to report their readings anytime**. Encourage reporting within every quarter. Specifically, this should allow participants who are travelling to report any time before and/or after their travel.
6. **Check any manual override of the notification system carefully.** Ensure that when a manual override to the automated reminder system is implemented, it is triple checked, or checked at a higher level, to ensure that the manual override is correct.
7. **Ensure users who change mileage reporting methods fully understand what will change.** Specifically, explain change of invoicing cycle and odometer reporting obligations better, including any change in invoicing cycle frequency, new odometer-reporting obligations, and new date of next invoice. This could be done by voice from a customer service representative, by email, or ideally, both.
8. **Plan for sufficient time to test integration between vendor systems.** Extensively, test integration and workflows between different vendor systems that support mileage reporting methods using odometer photo capture.

III. RUC Participant Management and Data Collection Operational Findings and Recommendations

RUC Participant Management and RUC Data Collection are the two functions of the state information technology system that would be needed in an operational RUC program. This section discusses lessons learned on these two functions.

RUC Participant management is the function of state IT software that provides real-time data on RUC Participants (which service provider and which mileage reporting method they are registered with) and ensures all participants registered only once. It involves service providers reporting participant registration and de-registration to the state. The testing team learned two main lessons about RUC Participant Management Functionality.

1. **Service providers should be required to support this functionality in near real time**. In other words, as soon as a participant registers with a Service Provider, the Service Provider should provide that participant's information to the state IT system via an Application Programming Interface (API). During the pilot, one service provider could

not support a near real-time interface, which caused a number of issues, including the inability to get accurate real-time information, and

2. **RUC Program Indicators should be defined before the system is built**. The RUC Participant Management functionality should provide information like the number of participants on each mileage reporting method, on each service provider, and their level of compliance. The precise indicators should be fully developed before the system is built.

RUC Data Collection or RUC Accounting (RUCA) is the function of state IT software that collects travel and revenue data on RUC Participants from service providers—miles traveled in state on public roads, in state off public roads and in other states, as well as the RUC charges associated with these miles, and associated data, such as whether devices were unplugged and for how long. It involves service providers reporting data to the state periodically, i.e., monthly. The testing team learned three main lessons about RUC Data Collection or Accounting Functionality.

1. **RUC Data Collection should be thoroughly tested before system is taken live.** Not just that numbers communicate, but that they mean the same thing across all vendor systems.
2. **Fixing data retroactively is challenging but feasible.** When data was found to be incorrect in the database, it was possible to send new data. However, older data is typically not deleted, so it is vital to ensure that the new/correct data is always used when appropriate. It is best to avoid sending incorrect data, but if and when issues are discovered, it is feasible to correct them.
3. **Fixed period data reporting is feasible and desirable for small programs; larger programs will require rolling reporting**. In the pilot, monthly reporting was used and found to be feasible and desirable. With a large program (100,000+ participants) it will likely be necessary to implement rolling reporting that does not coincide with a reporting period.
4. **Prepare for reconciliation of invoices with Road Usage Charge Accounting (RUCA), the state data collection mechanism,** by doing the following:
    - Establish consistent RUCA rules and invoicing rules. Establish the rules at the same time to ensure consistency.
    - Specifically, ensure that the RUCA reporting period and invoicing periods are identical. In case of rolling invoicing periods, this is not possible, so use appropriate rolling period accounting techniques to establish RUCA reporting periods.
    - Further, ensure that the transactions contained in invoices and RUCA reports are the same. For example, in the WA RUC pilot, questionable or quarantined transactions were included in the RUCA report, but were not necessarily included in the corresponding invoicing period.