QTS works collaboratively with customers to implement a proven strategy for maximizing railcar utilization, on-time delivery, and customer satisfaction through managed service and proactive intervention. Here we document the process used and provide a case study showing how QTS was able to improve railcar utilization for one of our clients.
**WHAT IS RAIL CYCLE OPTIMIZATION?**

**Rail Cycle Optimization** encompasses the process of effecting improvements to the length of *railcar cycle times* and a reduction in overall *transit variability*. This is achieved through *managed service*.

Managed Service provides for improvements through both understanding and compensating for the *cycle time performance*.

This process can affect positive changes in many areas, including:

- Customer Service & Overall Satisfaction
- Fleet Sizing, Pool Assignments, and Car Supply
- Process Efficiency and Consistency
- Organizational Communication and Teamwork
- Cost-to-serve

**Cycle Time Performance**

A typical rail cycle (loaded to end customer, and empty back to reloading point) is also known as a “loop.” These rail shipment cycles or loops consist of four distinct stages:

**Moving Loaded**: This refers to the movement of the car on the railroad(s) designated from the origin loading point to the customer’s unloading facility. This cycle stage commences with the release of the railcar from the origin plant via the transmission of a bill of lading, and is typically denoted by a release or “W”-code Car Location Message (CLM). It completes once the railcar

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**QTS**

QTS is a rail logistics company which provides proactive service, asset management, and technology solutions to some of the biggest names in North America. Our industry-leading expertise enables QTS and our customers to maximize the value of rail to gain a competitive advantage in today’s marketplace.

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is placed at the customer, either constructively or actually (CLM “Y” or “Z”).

**Layover:** The time the railcar sits on-site with the end customer being stored and unloaded. This cycle stage commences with the railcar placement notification at the customer (“Y” or “Z” CLM) and completes when the customer empty releases the car to return to its point of origin on reverse routing. The completion event is an empty release, or “W” CLM.

**Moving Empty:** This stage refers to the travel of the railcar from the customer’s plant back to the origin facility over the rails. It commences with the empty release (“W”) and completes with an empty placement notification (“Y” or “Z” CLM) back at the origin point.

**Origin Plant Load:** This final cycle stage refers to the length of time the car sits at the origin point awaiting the process of being re-spotted and reloaded with material to commence another railcar use. It begins with the empty placement notification (“Y” or “Z” CLM) and completes when a new bill of lading and loaded release (“W” CLM) is reported.

Capturing these release (“W”) and placement (“Y” or “Z”) events is crucial to doing an effecting cycle time study and optimization program. Rail carrier CLM reporting can be incomplete, requiring managed service to ensure collection of all required start and stop dates.

Note: Railcars must also make movements to and from rail shops for scheduled maintenance, inspection, and repair. These cycles, while similar, should be treated separately.
RAIL CYCLE ANALYSIS

For the purposes of this case study, we will look at the rail cycle times for one particular QTS customer. The chemical supplier’s statistics are fairly typical for the industry:

![Pie chart showing rail cycle times]

**Above:** The customer’s entire rail fleet utilization for a 12 month period is shown. Overall, their railcars spent 18% of their time moving loaded to customers, 21% of their time sitting at customer sidings to be unloaded, 21% of their time traveling back to the origin plant, and 35% of their time at the plant being switched back in and reloaded. The analysis also showed 5% of the time the railcars are either traveling to, sitting at, or returning from rail shops.

**Direct Control versus Indirect Control**

The first thing you will note in evaluating the cycles above is the difference between when cars are in the direct control of the shipper, and when they are not. Obviously, when the railcars are sitting at the shipper’s plant awaiting loading and movement they are in the shipper’s direct control. Likewise, when and how a railcar is sent to the shop could be seen as falling directly under the shipper’s control. These two stages allow the shipper to make internal decisions, plan performance, and measure their results independently.

The other three stages, Moving Loaded to the customer, in Layover at the customer, and Moving Empty back to the plant are seen as not under the shipper’s direct control. These stages rely on the
performance of the railroads involved, and the speed at which the end customer chooses to unload the cars.

Thus, while the shipper can review their procedures and make internal decisions relative to the performance of railcars under their direct control, there may be a consideration that these three cycle stages are more difficult to influence.

Considering that the majority of the client’s railcar time is spent in these three stages (not under their direct control)—some 55% to 80% depending upon the customer and the industry, we must ask how these stages can be optimized in an effort to minimize railcar expenses and cost-to-serve customers.

**OPTIMIZATION PHASES**

The QTS process for optimizing rail activity includes the implementation of a project plan managed by a QTS Service Delivery Team Coordinator. The Coordinator works with the client to navigate the four phases of the optimization process: **Discovery, Targeting, Action, and Review.**
Through each phase, the QTS Service Delivery Team Coordinator works to facilitate the ongoing monitoring, documentation, and communication amongst the team (QTS and Client).

**Phase 1: Discovery**

The first phase of the optimization process is to do what we call discovery. This includes the following key points:

- **Identify the Team**: The QTS team will consist of assigned individuals from the QTS Tracking Group, as well as the Coordinator, and members of other departments as needed, such as the EDI Services Team, Fleet Management personnel, and Reporting and Analytical resources. From the shipper client, the Rail Manager is typically involved, along with resources from Supply Chain, the Plant, Customer Service, Sales, and even IT.
  - The team is facilitated by the QTS SDT Coordinator via regular conference calls, and the team’s work, including current tasks and milestones are typically managed via a collaborative online workspace or project page, where members of the team can add and edit information as the project moves forward.

- **Identify Customer Requirements**: This includes determining On-time expectations, any Required Delivery Dates (RDD’s) produced by the shipper for the customer, and any Vendor Managed Inventory requirements.

- **Identify Data Assets and Liabilities**: Track & Trace information, shipment deviation and exception data, ERP data, plant management systems, order histories, and Railroad-provided trip plan and transit time information is typically included in this list.
Data Integrity is key: Note that for any optimization project to be successful, ensuring the completeness and accuracy of the data is vital. Managed Service allows QTS to provide complete rail transit data.

- Identify Constraints: Plant switching schedules, Car supply (fleet, pool, free runners), order & production processes can all create constraints to the project and should be considered.

- Establish Format & Schedule For Meetings: Monthly or Quarterly full-team reconnects, with more frequent meetings of individual stake-holders or sub-groups focused on individual tasks are important to schedule to maintain the velocity and momentum of the project.

Phase 2: Targeting

The second phase, known as targeting, begins once the team has collected and analyzed the data available to them. The purpose here is to identify what to go after—the “low hanging fruit” and subsequent opportunities.

Here are the key points to consider during targeting:

- Identify Key Cycle Performance Metrics. A few worth noting are:
  - Transit times and variability, including the average, median, and standard deviation.
  - Customer hold times in the layover stage
  - Rail cost to serve including freight costs and demurrage charges

- Evaluate the Current Data to:
  - Identify Improvement Opportunities: What to attack.
  - Prioritize Opportunities based on variable considerations: Which customers, lanes, or railroads have the most opportunity for improvement? What external business or commercial considerations must be included?

- Establish Targets & Supporting Data: Set realistic goals based on reliable data and available resources.

Who’s making the grade? A targeting technique

One way to evaluate which areas to address is utilizing a QTS Product Delivery Analysis. This evaluation, also known as the “PDA,” grades lanes on an “A” through “D” scale. The objective is to
have as many lanes as possible in the “A” to “B” range by influencing both railroads and customers that negatively impact the grades.

The grading is based on an analysis of the stability of the loaded rail move stage, and the length of the customer layover stage:

**A: High Stability/Low Layover**

This category represents opportunities to increase the amount of rail being utilized. Deliveries are consistently on time and cars are being unloaded expediently by the customers. If there are truck shipments being routed this same way, then you should consider changing from truck to rail for these destinations to save transportation costs.

On the outbound side, if the amount of product your customer buys from you is only a percent of their total purchases, then a sales opportunity exists for your customer to re-analyze the total cost of the competition in comparison to you, i.e. inventory cost plus transportation cost. If the competition's product delivery performance is less than optimum, then their cost may be higher.

On the inbound side, if the amount of product you are buying from these suppliers is only a percent of your total purchases, then a cost savings opportunity exists for you to re-analyze the total cost of doing business with your other suppliers, i.e. inventory cost plus transportation cost. If the product delivery performance of your other suppliers is less than optimum, then their cost may be higher.

**B: High Stability/High Layover**

This category represents opportunities to increase car utilization and reduce your customer's inventory costs. This is an opportunity to work closer with the customers to better understand their unloading process and why their layovers are so long. Product is being delivered on a consistent and reliable basis. Scheduling deliveries will help to increase car utilization and reduce inventory costs, a win-win.

**C: High Variability/High Layover**

This category requires us to look closely at the reasons for the delays that occur along these routes. The strategy here is to understand trends in terms of where variability is occurring and why, and who we can speak to so that these delays may be prevented. The objective is to reduce the variability in the loaded transit times by eliminating the causes of the delays as much as possible. We can do this by providing to the party responsible the cost/benefit associated with preventing the delay.
D: High Variability/Low Layover

This category may expose your customer to serious risk. There is a greater probability that your customer could experience a stock out condition and the resulting downtime. In this category, as with any high variability condition, our objective is to understand what is going on so that we may eliminate the causes and reduce the variability in the transit times, and thereby reduce the cost of transportation.

Phase 3: Action!

Once the data has been collected and analyzed, the next step is to take appropriate steps to achieve improvement in the identified areas. Some of the more common actions to take include:

- **Establish Lead Time Standards for Transits**: This includes setting realistic, process-based standard expectations for delivery for each rail lane based on historical performance. If 85% of your shipments from a point A to a point B arrive in 8 days, the transit standard should be set to 8. This allows the shipper to know how much rail lead time is required for on-time delivery, and it creates a benchmark from which further improvement work can be measured. These standards should be maintained and synchronized in all affected systems, including the railcar tracking system, and any ERP or Supply Chain applications. However, transit standards are only good when they are continually re-evaluated. Variances in rail service up or down should be considered, as well as normal and expected variations in product consumption and railcar utilization due to seasonality.

- **Determine Resolution Steps (Tactical & Strategic)**: These steps should include things like establishing a proactive intervention service to capture and resolve railcar shipment deviations and exceptions en route, managing layover issues both at the customer and shipper plant to minimize car dwells and demurrage and detention charges. Better system integration is another area to explore, where IT resources can be tethered to enhance and improve the process of order to shipment to delivery. Lastly, the rail carriers should always be invited to participate in Service Deliveries. Carrier meetings can be successful in educating the railroad personnel on their performance, where delays are occurring, and the ultimate impact on your business. Often, they can make incremental improvements on their side that can result in valuable reductions in cost and time for the shipper.

- **Assign Resolution Action Items to individuals/subgroups**: Once action items are identified, assigned, and documented, milestones must be maintained and ongoing communication loops between the team members must be assured. Again, this is
where we highly recommend the use of a collaborative online work space, especially when team members are from different organizations, departments, and locales.

Proactive Intervention: Working Smarter Not Harder

Proactive intervention with the railroads to minimize delays can have a huge impact on overall rail fleet performance during loaded and empty transit cycles, and goes a long way towards reducing variation and tightening transit standards. However, in an effort to maximize resources and minimize effort, it’s important to address only qualified railcar delays.

While some delays like bad orders, holds, and no bills are quickly identifiable and require immediate action, other railcar delays may or may not require intervention. The so-called, “slow mover” should be evaluated against standard railroad performance before intervention should take place. For example, a 48 hour dwell in Houston, TX might indicate a very fluid yard and result in the car arriving ahead of schedule, while a 48 hour delay in Richmond, VA might indicate a real problem. Knowing historical rail performance on a yard-by-yard level is crucial to maximizing your intervention and resolution resources.

Proactive intervention on qualified railcar delays results in improved rail performance during loaded and empty transit cycles and reduces variation. Examples of delays to identify & proactively resolve include:

- Bad Orders
- No Bills
- Holds
- Broker/Customs issues
- Mis-billing & Misclassification
- Delays at Origin
- Yard Delays En Route
- Interchange Delays
- Delays at Destination
- Diversions & Unanticipated Routing changes

Proactive intervention means contacting the carriers for true delays and working with them collaboratively to resolve the issue expeditiously. Doing so for all cars en route has a cumulative effect that results in more railcar cycles per year, and a lower cost-to-serve:
Phase 4: Review

The final phase of the Service Delivery Process is to perform and fully document a “Review & Retrospective” meeting on completed deliverables. The meeting is designed to have the team reflect upon what was accomplished and how it was accomplished to ferret out the benefits obtained and the lessons learned.

- What did we deliver?

- Were we able to achieve improvement?
  - Why or Why not?
  - How do we quantify this?
    - Financial Impacts
    - More efficient processes/time-savings
    - Increased Customer Satisfaction
    - Better understanding & teamwork

- What did we learn from this deliverable?
  - The process: How well did we work together? Recommended changes?
  - The Result: What can be applied to other deliverables/targets?
Often, the retrospective delivers quantifiable results for the shipper; results they can take to their management to show progress. In other cases, the result may be less quantifiable, but no less valuable, as the process may uncover hidden issues and discover impediments not previously known. Either way, the value of the process is underscored, and the results from the meeting often materialize in the form of new action items and planning for the next Service Delivery Team cycle.

The value of the Service Delivery Team process to both the shipper and QTS, and the resulting benefits in both quantifiable gains and better communication and operation efficiency are easy to see and validate.

To that end, we are including the attached case study on one lane for one customer below.

**A CASE STUDY**

**CASE STUDY PARTICULARS:**

*Client:* Shipper of Chemical Products in Net Leased Hopper Cars

One of the lanes targeted by the team through Discover & Targeting:

- **Origin:** Plant in Southern Mississippi
- **Destination:** Client location in Northern Illinois
- **Route:** CSXT-(NEWOR)-NOPB/CN
- **Previous Year Volume:** 297 shipments
- **Upcoming Year Anticipated Volume:** 320 or more

This lane was targeted for the following reasons:

- Volatile rail transit times
- Medium-to-High Customer Layover times
- Predicted increase of volume of transits
- Considered a valuable customer and a lane of issue for them.
**Actions Taken**

The Service Delivery Team discussed the lane and made a list of recommended paths forward. These included the following:

- **Lead Time Standard Established of 9 Days** (Estimated for 80% on-time delivery), and loaded in SAP system.

- **Proactive Intervention process established** on the lane for all deviations and exceptions en route. 48 hour threshold after normal RR dwell.

- **Daily reports built for ongoing visibility on inbound pipeline** for client and shipper customer service personnel.

- **Detention report established** showing the number of cars on hand in placement status, and the number of days on site.

Weekly Meetings established between QTS Team, and client’s Rail Logistics Team to discuss status on targeted lanes, supplemented with Quarterly updates on all.

**The Results**

The results of the actions taken 12 months later are provided below in graphical form, based on the performance change of each of the three shipment cycle segments in the “indirect control” category:

**First, the Moving Loaded Segment:**

- **Year one**: Loaded Transit Leg Average: 8.64 days, 80% completed in 10 Days
- **Year 2**: Loaded Transit Leg Average: 7.59 days, 80% completed in 9 days
While the total number of shipments increased from year one to year to from 297 to 325, the average loaded transit time reduced from 8.64 days to 7.59 days (a one full day reduction). Additionally, the use of a Lead Time Standard of 9 days resulted in a higher visibility on late cars, which helped increase the 80% on-time percentage from 10 days down to 9 days.

Second, the Customer Layover Segment:

The hold times for customer unloading reduced by an average of 3 full days. In year one, the customer was holding railcars an average of 17.47 days to unload, and to 25 days for an 80% completion ratio. In year two, after the customer began receiving daily visibility reports and were fully apprised of the issue, layover dipped to an average of 14.48 days, with an 80% completion ratio at 22 days.

The loaded ½ of the cycle was able to see an improvement of 4 full days on average, per shipment, or

an aggregated 1300 railcar days. That equates to 3.56 railcars over the length of the year.

Similar efforts were made on the empty side of the transit cycle.
The Moving Empty Segment:

The work done to provide proactive intervention on qualified rail delays saw real benefits on the empty transit leg as well, where the average transit time dipped from 9.94 days in year one to 8.31 days in year two, a reduction of 1.5 days. Additionally, the 80% completion ratio likewise improved, with 12 days being required to achieve 80% on-time delivery in year one, and 9.5 days in year two.

The complete Cycle:

Interestingly, the origin plant load cycle time actually increased, which is to be expected considering the transit times improved so dramatically. However, this puts extra railcars under the shipper’s direct control, allowing them to make decisions to sublease, off-lease,
or remove cars from the fleet in other ways. One customer was able to reduce their fleet from 625 cars to 400 using this method.

**The Final Analysis**

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<tr>
<td><strong>Total Average Cycle Time Year One</strong></td>
<td>36 days</td>
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<tr>
<td><strong>Total Average Cycle Time Year Two</strong></td>
<td>30 days</td>
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<tr>
<td><strong>Net reduction in cycle</strong></td>
<td>-6 days</td>
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Year two volume: **325 shipments**

- 325 shipments at 36 day cycle | 11,700 Railcar Days
- 325 shipments at 30 day cycle | 9,750 Railcar Days

**Net Difference:** 1950 Railcar days

1,950 Railcar days divided by 365 days per year = **5.34 Railcars**

If we assume these 5.34 railcars were reduced to serve this one lane alone, and we assume the cars are Net Leased, using conservative figures, the savings on this one lane would be:

- $600.00 average monthly lease cost
  ($3,204.00 per month or $38,448.00 per year)
- $1000.00 average annual maintenance cost: $5,340.00 per year

■ **Total Potential Savings (this lane): $43,788.00**

*Plus improved on-time performance, better planning, less volatility, and improved customer satisfaction!*

**What can QTS do for you? Let us show you.**

Call us at 800-443-2599

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