

*Teaching Case*

# Black Box Thinking: Analysis of a Service Outsourcing Case in Insurance

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## Abstract

Often, users of information systems (both automated and manual) must analyze those systems in a "black box" fashion, without being able to see the internals of how the system is supposed to work. In this case of business process outsourcing, an insurance industry customer encounters an ongoing stream of customer service issues, with both the original provider and outsourcing organization. To understand and validate what is happening with his account, the insurance customer (Edward) and his representative (Penny) must deduce the operations, business rules, and data flows of the organizations. Most importantly, have the operations of these organizations released anyone's data inappropriately? And are these same customer service issues happening to other customers, who may not be in a position to spend the time and energy needed to catch and resolve them?

**Keywords:** Outsourcing, Information quality, Data migration, Business rules, Black-box, Case study

### 1. OVERVIEW

Often in business operations (particularly when technology is involved), professionals are compelled to try to understand how a system works without being able to study the internals – also known as "black box" analysis (Todd & Benbasat, 1987). Such an analysis might be required because of a proprietary system, a customer relationship that doesn't allow an internal view, or other causes.

In this case study, a large long-term care insurance provider (LTCCo) outsources its customer service business process to a third party (ServCo), creating a number of impacts on its customers, from unclear billing to late

payments on claims. Given that most users of long term care insurance are older and often less able to manage their own claims, this sort of issue is particularly troubling.

Edward was one of the customers who was impacted by the transition of customer service processes. Edward's daughter, Penny, was assisting him in managing his claims. Initial servicing had gone reasonably well (with some notable errors), but partway through the process of initiating claims payments, LTCCo outsourced their servicing business process to ServCo, and advised their customers of this transition.

Following the transition, numerous issues arose with the servicing of Edward's policy. These

included delivery of checks made out to the wrong person, incorrect billing, incorrect payments, misplaced documentation, and other issues. Penny worked with ServCo to try to resolve these issues, and at the same time tried to analyze what underlying system problems were allowing the issues to erupt. Over the course of the 6 months of active conversation, Penny spent well over 30 hours on the phone or on hold with LTCCo and ServCo.

LTCCo and ServCo use information about their clients to make decisions about how to handle claims, issue bills, credit payments, etc. They base these decisions on the information available and on business rules that should guide them to make decisions that are legal, contractually correct, and consistent across all employees and customers. See Figure 1 for a general overview of the decision-making and communication processes. Note that the decision-making and communication processes are somewhat separate – decisions may be made by computers or humans, and the communication may be by a human or by a computer (in the case of an online system, or an auto-generated letter).

The goal of this case study is to provide a series of scenarios, including process inputs, outputs, and known business rules, from which you can infer the processing and information availability at LTCCo and ServCo. You can also provide recommendations on how to improve operations so as to avoid these types of customer-facing issues. We have provided questions specific to each scenario as a starting point for your consideration.

In section 2, we provide some important technical and business definitions which will help to understand the rest of the case. In section 3, a number of scenarios are outlined which illustrate issues with data flows, business rules, and decision-making. Finally, section 4 provides some concluding remarks. A short video overview of the case is available at <http://youtu.be/dHZEp3DpGeg>.

## **2. TECHNICAL AND BUSINESS BACKGROUND**

This section will provide a brief background so that you will have a consistent understanding of the business and technical elements of the case.

### **Business Elements**

Long-term care insurance is designed to cover the costs of care for individuals who can no longer safely perform some of the “activities of daily living” – eating, dressing, bathing, etc.

Servicing, in the insurance industry, is the function of processing claims, interacting with customers, issuing bills, processing payments, etc.

A business process is a set of related tasks that accomplish a particular business function (e.g., creating a bill, accepting payment, paying a claim).

Power of attorney is a document that allows one or more individuals (in this case, Penny) to work with healthcare-related organizations (like LTCCo) on someone else’s behalf (e.g., Edward).

Information is an organized collection of facts (data) about people, places, things, concepts, etc.

Business rules are the rules which govern human and automated operations of an organization, including such things as authentication requirements, eligibility rules, payment limits, etc.

Decision-making is the process of determining the next steps to take, given a collection of available information and applicable business rules. It may be entirely manual, partly automated, or fully automated.

Information ethics deals with the ethical principles related to the management and use of information, particularly as it relates to the impact of that information on people (ACM, 1992).

### **Technical Concepts**

Outsourcing is the transfer of the execution of specific business processes to a separate organization, often done with the intent to improve efficiency, quality, or both (Lankford & Parsa, 1999). Outsourcing is often enabled by information technology, so that the two parties in the outsourcing arrangement have access to the same information.

Data migration and conversion is the process of moving data from one system to another, either within or between organizations. In this case, LTCCo had to transfer customer records (both

paper and electronic) to ServCo in a timely fashion so that ServCo could begin processing customer activity on the planned date.

Black box is a term that refers to being unable to directly see and understand the internals of a system or process, requiring users to infer its structure based on external observations (Todd & Benbasat, 1987). In some circumstances, this might also be referred to as inductive reasoning.

As a simple example, consider what happens when you try to use a credit card for payment. Inputs to the system include your card information and the location, type, and amount of your purchase. Output from the system is either an approval, or some form of disapproval of your transaction, but the details of how that decision is made are not visible to you. For some online examples that you can try yourself, please visit the Black Box puzzle examples at [www.toxicode.fr/black\\_box](http://www.toxicode.fr/black_box) (Toxicode, 2015).

Information quality is a key measure of the success of an information system. The term is used to describe various characteristics of information, including accuracy, accessibility, timeliness, format, and other factors that make it available and suitable for use by organizations and individuals (Lee, Strong, Kahn, & Wang, 2002).

### 3. FLOW OF EVENTS

Penny, working on Edward's behalf, had successfully started the claims process (requesting reimbursement for covered expenses) following Edward's stroke in February, 2015. Just about the time that claims payments began, though, Edward received notice that ServCo would take on servicing responsibilities from LTCCo in June, 2015.

This is when the servicing of Edward's account began to unravel. He experienced the following issues: a check made out to someone else, errors in billing, errors in payment processing, and customer service inconsistencies. In each of the scenarios below, you will have an opportunity to diagnose what information the ServCo and LTCCo employees are seeing and interpreting, and how that information might be better designed and delivered to the employee and the customer to avoid the problems. As noted, such diagnoses have to happen in "black box" fashion, as neither ServCo nor LTCCo will reveal the internals of their operations to customers.

A high-level overview of the events of the case may be found in the Appendix, Figure 2. A detailed timeline of the interactions between Edward, Penny and LTCCo and ServCo is provided in the Appendix, in Table 1. The key events include a mis-named check, billing errors, mistakes in mailings from ServCo, unexplained payments, and contact with both the Chief Information Officer (CIO) and chief counsel at ServCo.

#### Check Enclosed ... Not!

In January, following his initial claims filing, Edward received copies of a number of letters that had been sent to his retirement home asking the management for documentation that LTCCo required before claims could be paid. Penny and Edward checked with the management at the retirement home to be sure the needed documentation had been faxed in to LTCCo. They learned that the documents had been faxed twice to LTCCo, immediately after each request was received.

Edward received a letter on February 19 stating, among other things, "your check is enclosed", "we need more documentation before we can make payment", "you have not yet met the eligibility requirements", and "because you didn't provide that documentation, we are closing this claim". There was no check in the envelope with this letter.

Penny called LTCCo, and confirmed that indeed, Edward had not yet met the full set of eligibility requirements. Eligibility for payments requires a medical or disability condition as well as an elapsed time period, which Edward had not yet met. The Customer Service Representative (CSR) looked online at the same letter that Edward had received, and agreed that the statement, "your check is enclosed," was misleading. When Penny asked if a new letter could be issued that was correct (so that Edward's files could be accurate), the CSR indicated that she would try to do that, but was not confident that it was possible. Ultimately, Edward did not receive a replacement letter.

Questions: What was wrong with the initial letter that Edward received? What information did LTCCo need so that it could provide a correct letter the first time?

#### Unexplained Payments

On April 7, Edward received his first claims payment for bills incurred in the prior month.

One June 8, he received an additional payment for that same claims period, though a much smaller amount. Given the errors that had happened so far, Penny was concerned that this might be another error, and that blindly cashing the check might set off other issues with the company, if it later found that the check had been issued in error.

Penny promptly called ServCo to inquire, and after resolving the Power of Attorney issues (see below), she was able to speak with a CSR and a supervisor (part of the "escalation team") about the issue. Neither was able to successfully explain why these additional funds were paid. Penny asked if there was an additional level of escalation available – and while none were available by phone, Penny was offered the option to write to the next level of management to request explanation.

Two weeks later, Penny received an answer from Raymond, a customer service manager, indicating that the additional funds were due to a change in the maximum allowable claims for Edward's policy. Apparently, LTCCo had underpaid (using the original policy limits), and ServCo had discovered the error and corrected it (by paying the additional amount), since the maximum amount had increased over the years that Edward held the policy.

In this case, ServCo had managed to uncover and resolve an issue in Edward's favor, without Edward or Penny realizing an error had been made.

Questions: As in the prior scenario, what could ServCo have done to prevent the customer confusion? What additional information and/or business rules would have been required to make this correction possible?

### **Someone Else's Name on a Check**

The first really serious red flags arose when on June 8 Edward received a check addressed to him, at his full correct address, but the check itself was made out to someone else (though the check itself also had Edward's full address, including apartment number). Penny immediately called ServCo's customer service number, and talked with the customer service representative. The representative indicated that they were able to see a copy of the incorrect check in Edward's files, but could not determine why the name was incorrect.

The representative also did not seem motivated to address concerns about whether this might be a problem that had happened to other customers, nor was she able to answer the question of whether Edward's name had been provided to any other customers.

Penny had a fundamental concern that this problem of misplaced data (that started this whole train of discussion) would happen to other people, and that Edward's data might be leaked as well. ServCo's customer service management was only accessible through paper mail, and this was not timely enough for Penny's concern. So, knowing the name of ServCo, she investigated the company online to try to find executives she could contact directly, and quickly found the name and contact information for the Chief Information Officer (CIO), who was very responsive to her concerns.

The CIO promptly referred Penny to the Chief Counsel (senior attorney) for ServCo, who was very helpful in resolving the issues. The Chief Counsel's staff took charge of the situation: they made calls to other departments to investigate the issues, listened to recordings of Penny's calls to ServCo's CSRs, and coordinated activities with customer service and the information technology organizations. They then provided thorough and detailed feedback to Penny about the problem and its causes and solutions.

Both the CIO and the Chief Counsel appeared, from their conversations with Penny, to understand the potential magnitude of the problem. The Chief Counsel initially told Penny that this was a one-time error as part of the migration from LTCCo. When pressed for how this could be (in an automated data migration, Penny believed that one-off errors like this would be unlikely), the Chief Counsel agreed that more explanation was warranted. Further conversation with the CIO led to the understanding that this phase of the process, for a small number of customers, was at least partially manual, resulting in the risk of one-time errors. ServCo maintains that no other customers were affected by this issue.

Questions: Based on the information provided, what operational scenarios might explain how the wrong name ended up on a check (ignoring, for a moment, ServCo's claim that Edward was the only client affected)? Why did the CIO refer Penny to the Chief Counsel for resolution of the issue? Assuming that ServCo's claim is correct,

that only Edward was affected, how might this error have occurred?

### Power of Attorney Issues

Immediately after Edward's stroke, Penny delivered Power of Attorney documentation to LTCCo, so that she would be allowed to talk with LTCCo on Edward's behalf. Before the transfer of servicing to ServCo, Penny spoke numerous times with LTCCo's representatives, with no mention of any concern about her Power of Attorney status. The CSR simply identified Penny through the usual queries about the insured person's name, address, etc., along with Penny's information (which was on the Power of Attorney document for verification). Penny had similar results in her first few contacts with ServCo, before June 10.

Some six weeks after ServCo took over operations, Penny called again to resolve one of the many issues that had arisen. While the initial few minutes went well, the CSR shortly indicated that the call could not proceed because Edward did not have a proper Power of Attorney document on file.

Penny asked to be transferred to a supervisor, and soon was speaking with James. James was unable to explain why Penny had been allowed to interact with LTCCo's customer service, as well as ServCo's for the last six weeks (albeit few contacts). James also appeared to become agitated, claiming that his company "had only had this account for two months". While this may have been true organizationally, the transition to ServCo was to have been invisible to customers, except for changes to phone numbers, etc. However, it is indicative of the difficulty that ServCo staff must have been having with finding and managing all of the data related to the LTCCo clients.

James asked Penny to fax in the Power of Attorney document, along with the death certificate for Penny's mother. Penny's mother was "first in line" for Power of Attorney, even though the document was worded to allow any of the listed people to serve as Power of Attorney.

Penny was given two different fax numbers, with the instructions to use one first, because that machine was closer, but the other should work as well. She did so, and called again on June 16 to verify that the document was received. During that call, the CSR indicated that the PoA was properly on file, but noted that it was the

original which had been transferred from LTCCo, not the one faxed in two days prior, nor was the death certificate available. Those new documents eventually turned up in the proper place in ServCo's files a couple of days later, and no further issues came up with respect to Power of Attorney.

Questions: Based on the information provided, why did these issues arise? In particular, why did ServCo work with Penny initially, but then stopped about 6 weeks into their operation of LTCCo's clients? And how did Edward's *original* PoA document resurface after Penny had faxed in a new one?

### Errors in Waiver of Billing

When a customer becomes eligible for long-term care claims payments, their payment requirement for insurance coverage (called insurance "premiums") is put on hold ("waived", or "put on waiver"), while the customer is actively collecting benefits. The specific details of how and when the billing is waived is defined by the specifics of the policy, based on the annual or monthly billing date and the date that the customer becomes eligible for claims payments.

The word "eligibility" apparently has some flexibility in its use at LTCCo/ServCo. At times in Edward's interactions with LTCCo/ServCo, eligibility referred to whether his condition met the criteria for long term care payments. At other times, eligibility referred to whether he met the criteria, AND had met a "claims deferral" period of 100 days from the time the condition first arose, intended to prevent short-term care issues from being billed as long-term.

Edward received his first claims payment from LTCCo on April 7, including a note from LTCCo that billing would be waived from that day onward. Penny called the next morning and received confirmation that the order to waive premiums had been entered (by a separate LTCCo department) on April 7. However, that business process normally takes up to 21 business days, which would make it likely to occur after ServCo took over. The CSR at that time made it clear that further premiums would not be required.

Given her experiences thus far, Penny was understandably cautious about accepting a verbal assurance, but she also had a document (the April 7 letter) that indicated premiums would be waived. So, on April 16, Penny called LTCCo to confirm details on the account.

LTCCo's CSR indicated that there had been an error previously in the waiver of billing notice, and that Edward would owe one month's premiums before the waiver could start (\$350). Then on April 17, Edward received a bill (dated April 9) for \$4,200 for the next year's premium, and on April 27, notice of LTCCo's upcoming transfer of servicing to ServCo on May 1.

The bills, it turned out, were variously based on monthly (\$350) and annual (\$4200) premium payment requirements. Edward's account was usually billed a year at a time, but the waiver of premium process allowed for it to be billed for only a month to bring it current. ServCo ultimately changed it to a one-month bill (again, a change in Edward's favor), but without explanation to Edward or Penny.

Question: What were the various errors, and sources of those errors, that occurred here?

### **Payment Processing Errors**

When Penny found that a premium payment was actually due, she immediately sent a check (check #1 for \$350) to the address on the most recent premium notice letter. This check was mailed on June 19, to ensure that it arrived before the policy would lapse on July 8 for non-payment.

Penny called ServCo on July 3 to confirm that payment was received, and ServCo reported that it had not been. Given that the policy would lapse on July 8, Penny immediately sent check #2, for the same amount, by overnight mail to the payment address provided by ServCo on the phone (which was different from the first payment address that she had used).

Organizations that handle large numbers of paper payments often use separate addresses for payment processing and for customer service correspondence, so that payments can be handled more quickly and securely. However, the correct payment address was not on the premium notice from which Penny paid.

On July 5, Penny checked online with her bank and found that check #1 had cleared, confirming that ServCo had received and cashed it. She confirmed with ServCo that the payment had been posted, and then issued a stop payment for check #2 (to avoid having to try to get a refund for that overpayment). On July 6, Penny called again to confirm that the actual waiver of premium status had taken effect, and was told that it had.

On July 18, Edward received a refund check for \$350, which ServCo indicated in a phone call on July 19 was a refund for check #1. ServCo also indicated that it had accepted check #2 as payment for the premium due. Since Penny knew that check #2 had been stopped by her bank. She also knew that check #2 would not clear, and thus, Edward's account would again be unpaid. Penny was able to arrange for ServCo to stop its own refund check and use those funds to make payment on Edward's account.

Questions: What data flow and information quality issues most provoked this problem? Whose errors were they, if indeed they were errors?

### **Ongoing processing errors**

While the major issues in interaction with ServCo had largely abated by the end of July, two relatively minor errors were repeated. Penny submits a claim each month for Edward's care provided by his retirement home. ServCo sends an acknowledgement of that claim, indicating it is in processing. About a week later, it sends another acknowledgement of the same claim, this time noting that it cannot be processed because it's a duplicate, even though Penny only submits it once.

Quarterly, ServCo requires Penny's care provider to reassess his need for long term care. This is done through a form called a Facility Cognitive Questionnaire, which the care provider completes and returns. However, it routinely takes 2-3 identical submissions of this document to ServCo before it is properly recorded and claims continue processing.

For both of these items, submission via paper mail or via fax seems to result in the same issues.

Questions: What do these issues indicate about workflow management and paper handling at ServCo?

## **4. CONCLUSIONS**

This case provides an in-depth look at real-world scenarios in the use of information for decision-making in the long-term care insurance industry. From these scenarios, you can assess system functions, business rules, information flows, information quality, and decision making in a black-box type of environment.

We encourage you to analyze each scenario, mapping data flows, apparent business rules, decision-making approaches (does the decision appear to be made by a human, or is it an automated decision by a computer?), and information delivery. There are clearly many opportunities for LTCCo and ServCo to strengthen their customer service operations and communications, and we hope you will try to identify not just the problem sources but also potential solutions.

"Thinking Beyond the Case" Reflection Questions:

- What are the ethical implications of providing services and information to vulnerable populations? Do companies in this industry have a responsibility to be even more diligent, to protect those populations?
- What other stories have you encountered or in news reports that required "black box thinking" to analyze and understand?
- What other situations have you encountered personally that required you to use black box thinking to understand the situation or problem?

### 5. ACKNOWLEDGEMENTS

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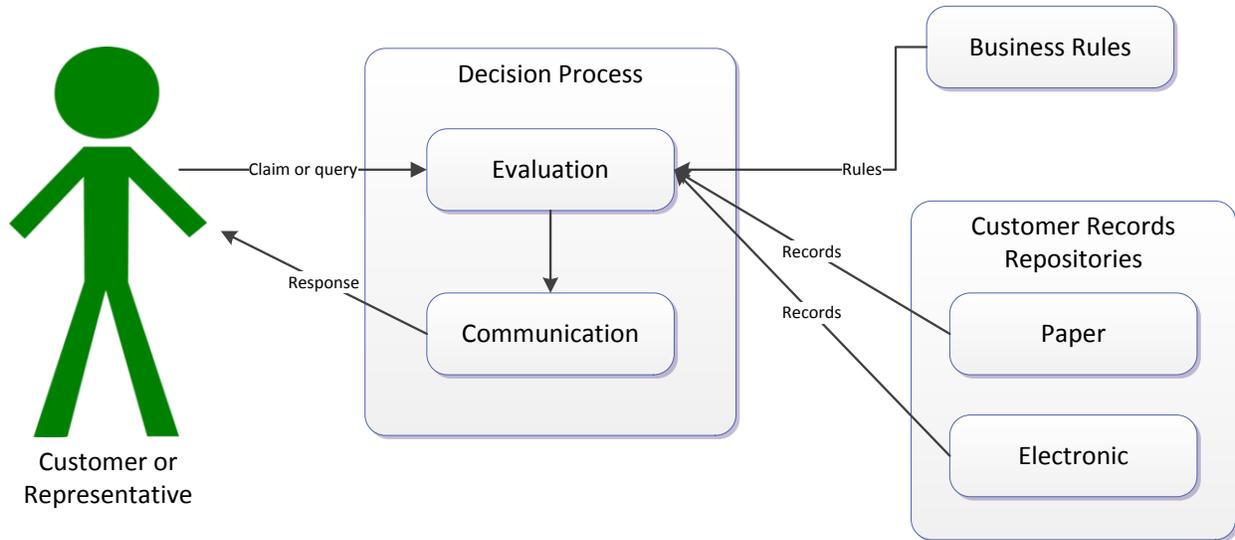
worked through the case study, and also provided critical feedback on writing and style issues to improve the case content. The authors also thank Penny and Edward for sharing their stories in hopes of supporting the learning process of business and information systems students.

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## Appendix

Decision making and business rules



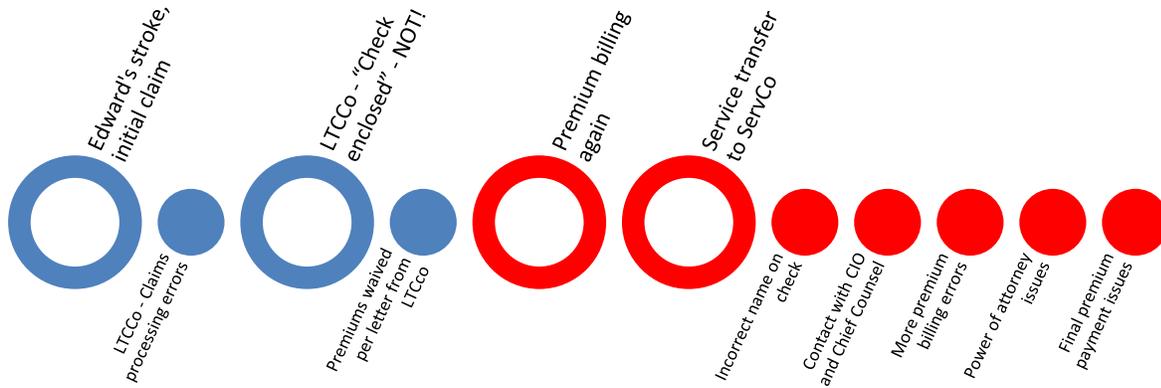
**Figure 1 - Generalized decision process and information flows**

Detailed list of events

Date	Event
Nov. 15	Edward suffers a stroke; initially meets criteria for eligibility for long-term care coverage
Jan. 15	First claim submitted – results in requests from LTCCo for facility information
Jan. 27	Second request from LTCCo for facility information – confirmed that facility had previously faxed the requested information
Feb. 13	Edward receives initial letter of eligibility for claims, confirming that both his condition and his facility met the conditions required
Feb. 19	Claims explanation received – “enclosed is your check” and in the same letter, “we need more information which you didn’t provide, so the claim is closed” – and no check was enclosed
Apr. 7	First actual payment after required 100-day waiting period, including a note indicating that further premium payments would not be required (i.e., premiums would be waived)
Apr. 24	Bill for premiums sent to Edward – Penny believed they had been suspended as of April 7
Apr. 27	Notice of transfer of servicing to ServCo
May 1	ServCo takes over servicing operations for LTCCo policyholders
June 2	Edward receives check made out to wrong person with unexplained amount (added payments for a previously paid claim)
June 9	ServCo sends premium notice – Edward owes \$4,200 by July 8 or policy will be cancelled
June 16	ServCo sends premium notice – Edward owes \$350 by July 8 or policy will be cancelled; Penny is notified for the first time about Power of Attorney issues and faxes in a new Power of Attorney document and death certificate for Penny’s mother.
June 19	Penny sends check #1, for \$350, to make payment before policy is cancelled, while continuing to make calls to understand billing; payment mailed to address on June 16 letter
June 20	ServCo sends premium notice – Edward owes \$700 by July 8 or policy will be cancelled
June 25	ServCo reports they have found the original Power of Attorney document
July 3	Penny calls to verify payment (check #1) received; it had not been received, and the check had not cleared the bank; Penny asks for confirmation of mailing address for payments (different, it turns out, from the address on the June 16 letter) Check #2 send on July 3 by overnight mail
July 5	Edward receives official waiver of premium letter; check #1 is cashed by ServCo and clears the bank; Penny issues stop order on check #2 after confirming payment had been received
July 6	Penny calls ServCo to verify waiver of premium status; CSR confirms
July 18	1) Edward receives refund for overpayment (refunding check #1) 2) Edward receives premium notice for \$700 due immediately, because check #2 was treated as the payment, and check #2 had been stopped by Penny
July 19	Penny calls ServCo to clarify issues around payment; confirmed that ServCo had issued refund for check #1, and accepted check #2 as payment (though this would not clear because Penny had stopped it); ServCo agrees to put stop order on its own refund check and treat that money as Edward’s payment
July 26	ServCo sends new premium notice for \$350; ServCo confirms to Penny by phone that that notice had been created before all the payments issues had been worked out
Ongoing	Monthly errors in claims processing – initial claim for each month’s service is acknowledged, and then, about a week later, acknowledged a second time with a note that this is a duplicate claim and will not be processed (even though each claim is only submitted once).  Quarterly, ServCo requires that Edward’s care provider reassess his disabilities to assess ongoing eligibility for long term care claims. Each quarter, the documentation seems to take multiple deliveries from the care provider to ServCo before ServCo’s records are updated.

**Table 1 – Detailed List of Events in Edward’s Case**

### Timeline Overview



**Figure 2 - High-level timeline of events**