

KANBAN IN AUTOMOTIVE IT

Improving Application Development
in a Distributed Global Business



Karin R. left the meeting room frustrated. “Why is the IT team not delivering?” Here it was again, this question that seemed to conclude every steering committee meeting. She did not have an answer. What she knew was that people had lost track of the process and felt helpless. In turn, Karin, as Service Delivery Manager, felt that she could not get a handle on the projects—she had no overview. She didn’t know when the IT team would release anything or how to help them. It was April 2012, and something had to change.

A little over a year later, Karin no longer gets such questions. In the middle of June 2013 her team delivered the largest-ever upgrade to the SWC application for processing vehicle warranty claims. This is the story of how the Kanban Method helped Karin and the SWC IT team to identify the issues inhibiting delivery, enabling a large, distributed team to deliver to its fullest potential.

Background

SWC, which Karin joined as Service Delivery Manager in early 2012, is the warranty claims system used in Volvo Group for heavy-duty vehicles such as trucks and buses. Each dealer uses it to handle warranty claims that have come in for a vehicle he or she has sold. Owners of heavy-duty vehicles are sensitive to claims handling. Volvo trucks annually transport around 15 percent of Europe’s food supply.¹ In order to do that, a truck may travel as many as 300,000 kilometers per year (850 km per day). For every day that the truck is not in operation due to malfunction, someone is losing a lot of money. There is a tangible cost of delay for Volvo’s customer—the owner of the truck. Claim-handling time is a critical factor in customer satisfaction. Efficient processing depends on a lot of communication handled by the SWC system. First, it sources all of the information about the vehicle, which acts as the vehicle’s passport, from one system. Then, it communicates the precise details of the truck and the claim to several other systems so that the claim can be processed correctly.

SWC was introduced for Volvo trucks and buses in 2004 and completely replaced the previous warranty claims system. Its browser-based web application was initially used only for the European market,

but other markets such as South America and Australia quickly adopted it. The team behind the SWC application was set up with a business side that gave the directions for what to build and an IT side that followed them. The SWC IT team was divided into a run-time team, responsible for ongoing activities such as maintenance and support, and a one-time team that took on projects for new functionality, including adaptation to new markets and business domains. Business analysts, architects, developers, testers, and support personnel handled the workload.

SWC’s development style had always followed the traditional software development lifecycle (SDLC) model with a phase-gate approach to progressing through the lifecycle stages such as analysis, architecture, and so forth. This model of software engineering is often referred to as the “waterfall” approach. First, all tasks would be thoroughly analyzed and approved for development. Then they would pass through the following stages: design, development, testing, integration, deployment, and maintenance, and emerge in one big completed and approved bundle. This batch-transfer nature of the SDLC is the signature of the waterfall approach.

Initially, the demand was low and this way of working had delivered good results in a timely manner for

years. The set cadence for releases was quarterly, and the IT team had always been able to meet it. However, the economic downturn in 2008 shrunk the SWC IT team to a minimum, leaving just enough people to provide support for the application. Introducing new major features or adapting to new markets had to be postponed.

After 2010, Volvo Group’s vision was to try to consolidate their business and optimize resources. Volvo had been steadily acquiring heavy-vehicle manufacturing businesses from around the world, which left the group with a diverse set of IT systems. The goal now was to seek some economy of scale by consolidating to a single set of unified internal systems for the Volvo Group across the globe. There were different software applications within the group that performed virtually the same function, and SWC was no exception. A heterogeneous set of warranty claims applications across the group was most likely contributing to sub-optimal claims processing for many customers. In the case of SWC, as with many other similar systems, the Volvo Group wanted to keep just one application that serviced all markets and brands within the group. Others would be decommissioned.

SWC was to become the global standard system for processing

¹According to data from the Volvo Group.

warranty claims. At the end of 2010, a global rollout was begun. The first step was to introduce the application to the third-largest market for the Volvo Group's trucks: North America. Thousands of dealers in the US, Canada, and Mexico were going to switch from an assorted collection of legacy systems to just one unified system for handling claims for the more than 200,000 trucks in use on the continent. Many of these legacy systems came along as part of Volvo's acquisitions. It was time to consolidate and achieve economy of scale from a single set of IT solutions across the group. However, before the application could be deployed to replace all legacy systems, it needed to be modified to account for local factories, national laws and regulations, and the capabilities of the existing warranty claims systems. SWC had never been tasked with such major enhancements. In the first few months, the project involved only system architects and analysts, who ran a pre-study.

Meanwhile, another major project came up for the SWC IT team in August 2011. The modification aimed to divide the information that SWC displayed in a logical, market-differentiated way so that once the application was completely global, people using it would not be overwhelmed by data. The dealers using it would view only information relevant to their own region. The project was conceived as more of a technical, backend change, and it had to be started as soon as possible. The IT team estimated that it would require 9,000 person-hours to complete.

Development work for both projects started almost simultaneously, using the same team members for both projects. The quantity of work-in-progress was significant, and both projects were a high priority. The team members quickly became overwhelmed and could not handle the workload. Recognizing the significant burden

of work, the team size was increased. In the span of just a few months, the IT side of the team almost tripled. Thirty-four people were divided between offices in Gothenburg, Sweden, and Bangalore, India. One of the new hires was Karin, the person who was supposed to ensure that this team functioned well and delivered properly. Karin assumed the position of Service Delivery Manager in March 2012.

The Problem

"I remember the awkward silence. Nobody said anything. I just heard keyboards click. And that went on for days," Karin says. Architects, developers, analysts, and team leads sat together, everyone struggling alone with their daily tasks. How well each managed and whether anyone experienced problems or needed help was unclear. The team had grown very quickly during a time when everyone was very busy. As a result, communication and collaboration with colleagues—whether locally or on the other side of the world—had not evolved yet.

"During the first meeting I had with the business-solution expert, the software architects, and a couple of the IT business analysts, I was supposed to get an overview of one of the projects. Instead, I left the room totally confused. I really didn't understand how far that project had evolved, what was left of it, and whether we were going to manage with it or not," Karin recalls. She looked for more answers outside the meeting rooms. What she learned was that, due to the importance of the projects and the difficulty of articulating and documenting requirements, the team had started on the projects too quickly, without adequate direction from the business side of the team. Consequently, there was no one to track what had been done versus what had been analyzed and estimated. No one knew what to

expect. "I could not get a clear enough idea of what was going on. Everyone gave me estimates and expectations, but nothing they said matched. All of the tasks for the projects seemed to have plunged into this giant black hole. It almost felt as if people had secrets and were deliberately hiding information from me," Karin recalls. The team was not delivering, and criticism grew. Everyone demanded answers. Tensions were growing and accusations were flying; it wasn't constructive. Seeking to attribute blame, however, would not get the projects delivered.

Karin and a newly appointed project manager, Sofia Hagberg, took the time to investigate where the core of the problem lay. Was it the way tasks were analyzed, developed, or tested, with responsible people not able to keep up, or was it that the business side didn't communicate the tasks properly in the first place? Whatever the problem was, Karin first had to find it, diagnose it, provide hard evidence for its existence, and only then propose actual change. "At the time, the SWC IT team had not delivered for a while, but we didn't feel that a single team within it was the problem. All these people were brilliant, and since we already were working waterfall, everyone did what they were told," the two recall. But the team was not efficient, and in order to identify the reasons for that, Karin and Sofia needed an overview of the entire workflow.

The Change

To get the overview, Karin knew she needed some sort of method that preferably would not change the way people within the team worked. There was too much ongoing work and deadlines to be met. Karin had witnessed a method used by another team in Volvo Group that visualized the work-in-progress. The Kanban Method seemed to be helping this other team to gain an overview, which was resulting in improved

management decision making and ultimately, better, more effective delivery. They had not changed the way they worked; they had simply made it transparent. Karin felt it could work well for her

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big projects, which she needed to visualize and understand without running any risk of introducing further delays. “I really did not want to have any more secrets between business and IT,” Karin says.

Anders Jonsson, an agile/lean coach in Volvo IT, presented the Kanban Method to the team in May 2012. Everyone had personally felt the criticism for failing to deliver and no one felt particularly happy with the current situation. This provided the motivation to try something new. The Kanban system seemed like a tool that was going to help everyone get a clear picture of what was going on in the entire flow, from the input queue to production and deployment. All thirty-four team members agreed to give Kanban a try. Karin received funding to implement it, as the Volvo Group had been encouraging more agility in its software development.

The Kanban Implementation

On September 17, 2012, the SWC IT team, after Kanban and tool training, began to work with a digital Kanban board they had designed to meet their specific and complex needs.² There were separate boards for projects, maintenance, support, and high-priority tasks. Even though everyone had agreed to implement Kanban, Karin feared that there might be hesitation from the team to put up

²The tool the team used was Swift-Kanban, a popular electronic Kanban system.

tasks where everyone could see them. “These are all 120-percent-type of people, working in a waterfall style. I think they were afraid of making a mistake in how they organized and placed the card where everyone could

see it. Besides, what if someone asked about the progress of an unfinished work item? They were a bit terrified. But for faster delivery, it was essential to get over this fear,” Karin says. The Kanban system provided the first picture of SWC: there were over 300 cards in the system, split among various boards.

Requirements and requests for the two big ongoing projects were transferred onto the boards just as if they had been created at the start of each project. Because of the process’s waterfall nature, tasks could not be spread evenly across the boards, but rather the whole batch was placed at a few steps in the workflow. The Kanban boards had been designed to fit the business process model that the Volvo Group had set as a standard for projects greater than 400 person-hours. This model placed decision gates at vital stages of the project, which affected the destiny of the project. Gatekeepers had to evaluate the risks for the project based on information gathered thus far. The first element that Kanban helped with was visualization of the individual steps between each gate. A column with “In Progress” and “Done” separations was created for each step so that the flow of tasks could be followed and measured more precisely.

The North America Project had more than 15 columns on its Kanban board. In the fall of 2012, everything that was needed for this project had passed analysis and was already in the development stage. Karin had

invited the business expert for the project to participate twice a week in their daily stand-up meetings³ that were introduced as part of the Kanban Method. “I was worried about how willing people would be to talk and participate. Less than half a year had passed since I had first joined. And I still recalled the silence in the room,” Karin says. The business owner attended the meetings in the beginning but then stopped. “He was not seeing movement of the tasks on the board from day to day and perhaps got frustrated over this,” recalls Karin.

By the end of October, SWC IT released ready functionalities for the first time since the beginning of the year. The release was for the project that aimed to enhance the display options of the global product based on location and avoid confusion caused by too much information. Karin had had a particularly hard time following this project. Naturally, the pressure for that release was huge. As soon as the release was out, it became clear that it included many defects. The production issues were so many that Karin decided to create a designated Kanban board just for them, so that she could follow the progress of defect fixing. Work for all other projects was paused so that everyone could focus on fixing the defects. There was no time for estimation or prioritization; everyone just pulled task after task.

As Karin observed that particular board, she saw how each task moved across it. In two weeks—by mid-November—all production issues were handled, fixed, and tested, and the requirements were rereleased. The first major part of a big project had been successfully launched. She learned an important lesson:

³The daily stand-up meeting gathers everyone from the team for about 15 minutes to discuss anything related to the progress of the work. Those meetings, attended by a large part of the team, are a good setting in which to resolve communication miscues within the team and solve work-related issues.

If tasks are small enough, if time is not wasted beforehand for too much prioritization and planning, and if people self-organize, delivery can be successful. “We are a team, and people will do the right thing if you leave them to it. Excessive control is not needed,” Karin says. She had now seen real evidence to reinforce that long-held belief. That evidence supported loosening the reins of control and letting the team run at a faster speed.

What Karin saw on the Kanban board during that two weeks in November gave her the first hint at the core reasons for the delivery delays, especially in SWC’s big projects. The style of requirements had to change: They needed to be small and clear. Only then would the delivery rate improve and the movement become more obvious. The fundamentals of creating requirements in SWC had to be shifted, and that was a conversation both IT and business needed to have.

In January 2013, Anders who had continued to help Karin ramp up and coach the team on the Kanban Method and Swift-Kanban after his initial presentation, decided to have a look at the metrics from SWC’s Kanban systems. The data provided by the electronic Kanban system really helped him diagnose the situation with regard to delivery rate, lead time, and people’s work behavior. He used the Kanban board for the North America project, spanning in four months, for reference. The flow efficiency, that is, how much of the entire delivery time was actually spent working on an item, was, at best, around 40 percent. On average, the lead time for a customer requirement was 60 days. Of that 60-day lead time, 35 days (at best) was working time—time in which the ticket was shown in the Kanban system to be in a “working” state, when someone on the team was supposed to be actively working on it. These statistics puzzled Anders since the numbers seemed to

“too good to be true.”⁴

In addition to Karin’s conclusion that requirements were too big, Anders determined from the metrics that team members had been pulling tasks too early and that they had heavily multitasked. Working on too many items at the same time, and too early, meant that the actual time spent working on a ticket (touch time) was a lot lower than it looked, and this delayed delivery and created waste. Work-in-progress limits, another core principal of Kanban, had been instituted as a general rule, but because the team had been working in a waterfall style, there were many items in a column, and the limits were both very high and not fully enforced or respected.

Karin saw how imbalanced the system was on so many levels. The waterfall style of working was in the way. It might have worked in the past, with smaller initiatives, but it surely made success on a big project impossible. The huge stacks of big work items didn’t allow flow. The constant shifting between tasks as large as 500 or 1000 person-hours was a huge waste of time. Everything was started and nothing was finished. At any given moment, a certain team—for example, analysts or architects—would be completely overloaded, while others were not nearly as busy. Kanban had acted as the x-ray and opened everyone’s eyes “to the ugly truth,” as Karin put it. “I remember one of the analysts coming to me one

⁴Forty percent lead-time efficiency is actually quite high. On first measurement, most consultants report clients at a five- to fifteen-percent flow efficiency. Electronic systems tend to exaggerate the flow efficiency, as tickets in “working” states are often waiting due to multitasking. Hence, forty percent is a best-case figure and would be true only if there were no multitasking or if workers were not distracted with non-workflow-related activities such as meetings, company bureaucracy, training, and so forth. While this flow efficiency metric at Volvo is actually very good compared to numbers observed elsewhere, it is encouraging that the managers and process coaches still used it as a catalyst to look for opportunities for improvement.

day and asking me why this Kanban tool we were using was so waterfall and why everything stayed stuck in each column and didn’t move. I honestly laughed. The Kanban board was showing just how bad our way of working was and how we previously did not have a clue.”

When Karin and Anders presented their findings in the winter of 2013, no one dared ask why the SWC IT team was not delivering any longer. Karin not only knew why SWC didn’t deliver—and had data to prove that the team was not the only one to blame—but she also had an idea for how to change it. For the first time since she had begun working in SWC, Karin felt empowered. She had a looming deadline on her shoulders: the North America project. Releases for it had been planned for April and June. April dawned with yet more development and testing to be performed for the release. Karin went for drastic changes. “If this doesn’t work out, we will probably have to look for new jobs,” Karin thought back then.

“Kanban had acted as the x-ray and opened everyone’s eyes...”

The April release was postponed and merged with the one in June. Everyone on the team had to help out for the release, even if that meant switching roles. “We had to think about the release and how everyone could contribute the most. We reorganized the team entirely,” Karin says. New team leads were placed in both India and Sweden so that responsibility could be shared. All unnecessary work such as writing documents was cut; meetings that could be skipped were not attended. Some might have objected to the drastic changes, but in the end the team had matured enough to see the logic in them and accepted the new regime.

Karin also decided to suspend usage of the large Kanban board(s) for a while. The reality of it was that the team had struggled with fitting their waterfall-styled, huge tasks in a Kanban environment. “We should have adapted the North America project the right way from the beginning,” Karin admits. High-quality delivery, on time, was her main agenda now. She broke down the remaining tasks into smaller stories so that everyone could stay focused and she could observe the progress daily and make adjustments if necessary.

The Delivery

That task-force sort of mode was in place for two months. Nobody worked on anything else but the release. It was a change of mindset: Work was part of a common goal—a good and timely release—not the next gate on the business model. And even though they did not have

a large visualized Kanban board, the spirit and culture of Kanban was sustained. People came to Karin to ask her if they had any blockages and she gave them direction: just the sort of outcome a daily stand-up meeting would have had. They finished a task before they started a new one. People had personal work-in-progress limits and were encouraged to keep to them and not multitask. In this manner, on a sunny Sunday afternoon in Gothenburg, the SWC IT team released all of the planned 160 change requests for the North America project, as well as the rest of the features for the location-based display of information. As a result, by the end of 2013 SWC will become the global warranty claims system for Volvo trucks and buses.

The Future

A lot of work is yet to happen for the SWC IT team to optimize processes and improve efficiency.

As the autumn approaches and a new strategic project begins, Karin is determined the process will be different. Both the business and the IT people now have an idea of how to work more efficiently. Principles such as a product backlog, tasks that are pulled and finished completely, enforced team and personal WIP limits, and an explicit “definition of done” will be incorporated more and more in the SWC workflow. A simpler Kanban board will be designed and projects will be organized so that everyone can observe the workflow, and collaborate, and continue to improve. SWC has shown that they can improve their delivery, providing a genuine business benefit for Volvo and its customers. Kanban has played an important role in enabling managers to make better decisions and focus their attention on the important issues affecting timely application delivery.

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