



Jesse Waas

Senior Technical Consultant

Summary

Mr. Waas has 9 years of experience driving technical innovation in transportation and communication industries, including three years as TriMet's in-house technical lead during the successful implementation of a world-class electronic payment system. Mr. Waas leverages previous experience as a software engineer, project engineer, and systems engineer to help agencies and vendors collaborate toward the successful implementation of technically advanced solutions to modern transit challenges.

Mr. Waas specializes in complex system design, implementation, monitoring, and testing. He is known for his ability to perform detailed technical assessments of problem areas, and to communicate options and risks clearly to both technical and non-technical audiences. Mr. Waas maintains a working knowledge of several programming languages, as well as a variety of foundational technologies including analog/digital circuits, RF systems, cryptography, key management, and infrastructure such as firewalls, databases, and load balancers. Mr. Waas is passionate about encouraging open architecture, robust deployment mechanisms, monitoring technology, security, and analytics, as well as working to prove that performance and reliability targets are met or exceeded.

Mr. Waas is one of the founding members of Clevor Consulting Group, a boutique consulting firm focused on bringing unique technical talent to the transport industry.

Project Experience

Hop Fastpass® Fare Payment System, TriMet, Portland, OR, November 2015-Present

Launched July 2017, this \$35M regional, bi-state fare collection system pushes both technical and policy boundaries within the industry and was delivered on schedule and under budget. This innovative, truly open architecture system uses a common set of agency-controlled APIs that integrate equipment and systems from over 10 different vendors. Customers have a variety of ways to pay (bankcards, smartcards, NFC mobile wallets) with a fully integrated retail reload network and system-wide fare capping. Hop Fastpass was the first system in the world to launch an NFC-based closed-loop virtual card in the Google Pay wallet. At the core of the system, is a state-of-the-art COTS financial management platform that provides sophisticated revenue accounting and enterprise-level financial controls. With a customer-first approach to design, the system had a highly successful launch, adding over 10,000 users in the first month with only few Customer Service calls each day.

As a Senior Systems Engineer for TriMet, Mr. Waas was responsible for the design, review, deployment, integration, and testing of all major electronic fare system components. Mr. Waas focused on back office infrastructure, security and load testing, partner integration, and virtual transit card development, as well as monitoring, day-to-day operation, and administration of the electronic fare system.

From a technical perspective, the on premise Hop Fastpass back office design supported VMWare virtualization, multiple high performance environments, and active-active load balanced services distributed across multiple sites.



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Mr. Waas led efforts to identify and mitigate security vulnerabilities across the system. This work involved independent technical investigation, as well as collaboration with an external security consultant to formally review all major system components. Several potential vulnerabilities were identified and mitigated.

Mr. Waas participated in performance testing activities utilizing Locust, BlazeMeter, and JMeter to exercise the consumer website, and API services prior to public launch. This testing focused on stored data volume, response time, and throughput, and helped identify and resolve several potential issues before the system was launched.

The Hop Fastpass system features an open architecture with RESTful JSON API interfaces that enable vendor interaction with the transit data model. Mr. Waas educated and supported vendors during their development, troubleshooted any reported issues, and developed ad hoc scripts as required.

As a world-first, the Hop Fastpass® team collaborated with Google to add support for virtual transit cards to the Google Pay mobile wallet. Using this technology, riders can provision a new closed loop virtual transit card to their mobile phone, and then tap their phone on fare validators to ride. Mr. Waas project managed this effort, working closely with Google and the other system providers.

Mr. Waas worked with TriMet IT to integrate the new electronic fare system into existing monitoring and notification tools, while adding application performance insight through New Relic application performance monitoring. These systems enabled rapid issue detection, response, and investigation.

Finally, Mr. Waas collaborated with the project team to support day-to-day operations of the electronic fare system, user management, patching, troubleshooting, and ongoing partner integrations.

P25 Radio System Replacement + SPDS Vehicle Location Service, TriMet, Portland, OR, 2010-2014

As part of a major communication system upgrade for TriMet, this project involved deploying a 7-site P25 trunked radio system across the Portland metro area. The system supported critical dispatch communication for the transit agency, as well as vehicle location services for approximately 2000 radio units. To obtain the agency's desired location update frequency of 30 seconds for buses, a custom data solution was required.

Mr. Waas designed and implemented real-time radio infrastructure software to support a proprietary narrow band TDMA data channel using standard phase 1 P25 radio reciter hardware. The project was a success, ultimately supporting 400 bidirectional data messages per data channel every 30 seconds.

Mr. Waas supported this project in a variety of roles over several years, developing additional software to support in-field radio programming or automated testing, as well as managing commissioning, acceptance testing, and equipment testing and replacement. The project demanded a high degree of domain specific knowledge, combined with technical and non-technical client communication, multi-vendor collaboration, change management, and long periods of on-site support.



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Work History

Senior Technical Consultant, Clevor Consulting Group, May 2018

In May 2018, Mr. Waas is joining Clevor Consulting Group where he looks forward to leveraging his experience with the Hop Fastpass project, and other complex systems to help design, test and implement innovative transit solutions for agencies around the world.

Mr. Waas brings a strong foundation of technical knowledge, and a passion for IT best practices, software design, security, cryptography, high performance computing, system monitoring, and transit innovation to this position. His exceptional communication style will support clients well during risk analysis and system architecture to facilitate thorough, transparent, and productive dialog between project stakeholders.

Senior Systems Engineer, Intelligent Transportation Systems, TriMet, April 2015-Present

Mr. Waas joined the Hop Fastpass electronic fare system project during the preliminary design review phase, and quickly established a critical role representing TriMet's technical interest during design discussions, vendor integration meetings, testing, and new feature development. Mr. Waas focused on back office infrastructure, security, load testing, partner integration, virtual transit card innovation, as well as system monitoring, and day-to-day operation and administration.

This role required close collaboration with agency IT staff and other key stakeholders. Strong technical design skills were required to evaluate vendor deliverables. Mr. Waas used his background and technical insight to quantify technical risk and communicate with the project team, informing the schedule, and project plan.

Systems Engineer, Tait Communications, September 2012-September 2014

Mr. Waas supported the detailed design, implementation and validation of Tait radio systems built with a variety of technologies including P25, DMR, MPT, QS2. Project deliverables typically included detailed design documents, coverage studies, network diagrams, RF loss and budget calculations, equipment lists, rack diagrams, power and heat studies, along with other technical material.

Mr. Waas took a leading role in system integration, and coverage verification, and continued to use software skills to automate processes and solve problems wherever possible. This role required on site surveys, design meetings, commissioning work, and acceptance testing.

Software Design Engineer, Tait Communications, December 2008-September 2012

As part of the Tait customization and integration software development team (TCI) Mr. Waas worked independently on a wide range of projects focused on leveraging existing Tait technology to fit customer's needs and enable sales. Projects included P25 infrastructure software, network gateways, radio feature modifications and other embedded products.

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This work required Mr. Waas to design, implement, test, and support technically advanced software written in a range of languages on various hardware platforms. Mr. Waas was required to communicate with other Tait engineers, support staff, technical writers and customers in order to gather the information required to solve complicated problems.

Ultimately this role instilled considerable experience with infrastructure technology, and the RF domain as well as a history of customer interaction and a philosophy of following projects through from inception to support.

Education

B.E., Electrical and Electronics Engineering, University of Canterbury, Christchurch, New Zealand, 2008

Mr. Waas studied electrical and electronics engineering, focusing on digital hardware and software design.

B.S., Computer Science, University of Canterbury, Christchurch, New Zealand, 2008

Mr. Waas studied computer science with a focus on software engineering, algorithms, and operating systems.

Professional Accomplishments

2017 – TriMet’s General Manager’s Safety & Service Excellence Award (excellence in supporting electronic fare system implementation)

2014 – Tait Brand Map Award (excellence in supporting TriMet CAD/AVL and radio replacement)

2012 – One Tait Award (excellence in supporting TriMet CAD/AVL and radio replacement)

Project References

Project: Hop Fastpass

Project Budget: \$35M

Employer and Role: TriMet, Senior Systems Engineer

Project Contact: Tim McHugh, TriMet, CIO, (503) 962-4927

Project: P25 Radio System Replacement + SPDS Vehicle Location Service

Employer and Role: Tait, Software Engineer

Project Contact: A.J. O’Connor, TriMet, Manager of Intelligent Transit Systems, (503) 962-5615