



COUNTY OF HAWAII PUBLIC TRANSIT APP DEVELOPMENT



Submitted to
County of Hawaii

COVER LETTER

Attn: Mr. Victor Kandle,
Mass Transit Administrator
County of Hawaii,
25 Aupuni St., Hilo,
Hawaii, 96720

Dear Team,

We are writing to express our interest in providing Programming Services for Public Transit App Development as outlined in the Additional Notice pursuant to HRS Sec. 103D-304(b). At ZED Digital, we bring over 7 years of extensive experience in implementing cutting-edge trip planning and mobile ticketing solutions for transit.

Our headquarters are in Columbus-OH. We hold a National Women's Business Enterprise Certification **WBE** by the Federal Government.

We believe our extensive experience and proven track record in developing public transit applications make us a strong candidate for this project. We look forward to the opportunity to further discuss how we can contribute to the success of Hawaii's public transit system.

I will be your primary contact and am authorized to enter contracts on behalf of the firm. You can reach me at 614.523.3974 sumithra@zeddigital.net, or 1275, Kinnear Rd. Columbus, Ohio 43212, in case of an interview.



Sumithra Jagannath

President, ZED Digital

Firm Information

Firm Name: Closerlook search services Inc DBA ZED Digital

Contact Name: Sumithra Jagannath

Title: President

Phone: 614.523.3974

Email address: sumithra@zeddigital.net

Location: 1275, Kinnear Rd. Columbus, Ohio 43212

Age of the firm: 17 years

Number of employees over the past 5 years: 25

Individual Qualifications

Sumithra Jagannath (20+ years) Project Role: Project Manager Workload Availability: 25% Skills: Project management, Usability Engineer, Digital Marketing Strategist Experience: President, ZED Digital, Digital Marketing & Software Development, Professor of Usability Education: B.Eng (Computer Science, 1990; M.Sc Computer Science 1992, McGill University	William Roberts (7+ years) Project Role: Full-stack developer Workload Availability: 100% Skills: Cloud hosting with Google Cloud and AWS HTML, CSS, JavaScript, JQuery, JSON, Angular, C#, and SQL Education: Otterbein University: 2010 – 2014 Columbus, OH Bachelor's of Science: Math and Science Education
Karthik Hariraj, Hardware & Cloud Engineer PROJECT ROLE: Installation, Test, and maintenance lead, hosting lead Workload Availability: 100% Education: Bachelor of Engineering in Computer Science, (2015 – 2019) Technical skills: Internet of Things, Payment Card Industry	Ruban Jayakumar (14+ years) Project Role: Lead Software Engineer & Architect Workload Availability: 100% Skills: Software Architect for ZIG, ASP .NET, Data Aggregation, Web, and App Development Experience: MDOT, CDOT, TARC, ACRTA, ZED Digital, COTA, Cleveland RTA, Ehash Software Solutions Education: B.E, Computer Science and Engineering – Anna University

Johnny Anthony, Mobile App Developer ZED Digital PROJECT ROLE: Cyber Security Specialist, Test, and maintenance lead WORKLOAD AVAILABILITY: 100% Education: Bachelor of Engineering in Computer Science from Sri Krishna College of Technology, Coimbatore (2015 – 2019) Technical skills: Android Programming, Block Chain, Network Security, Internet of Things, Payment Card Industry Security	Emerson Keppler CREATIVE DIRECTOR Workload Availability: 25% Education B.F.A. Graphic Design & Advertising – Columbus College of Art and Design Skills Graphic design, UX/UI, Mobile app design, Proficient with Mac and PC, & full Adobe Suite!
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References

CLIENT'S REFERENCES		
ACRTA, Lima OH 2023 till Ongoing	Multimodal trip planner with Fixed Route, On Demand services, Lyft, AVL validators onboard vehicles	Brian Wildermuth Co-Executive Director brian@acrta.com
Ecolane Inc 2022 till Ongoing	Mobile ticketing and trip planner integrating fixed route, On Demand, ADA, Microtransit, Uber, Lyft, Bikeshares, Scooters in single app X4MaaS. Contactless mobile ticketing, onboard validators – sensors with ADA Compliant validation with phone in pocket	Susan Clutter, Director, Business Development, Ecolane susan.clutter@ecolane.com
ViaPlus (Vinci Highways) 2022 till Ongoing	Multimodal Trip Planner platform	Richard Arce President Email: arce@viaplus.com
LETS Public Transportation 2023 till Ongoing	Michigan Mobility Wallet with MaaS trip planner and mobile ticketing, trip booking for Demand Response services	Adam Baranski Deputy Director abaranski@livgov.com
Clinton Bluebus 2023 till Ongoing	Michigan Mobility Wallet with MaaS trip planner and mobile ticketing, trip booking for Demand Response services	Ty Piontek, Operations Manager (989) 534-2704 piontekt@clintontransit.com

Experience Statement

From Transit Mobility as a Service Solutions to Contactless Mobile Payment and fraud detection sensors, ZED Digital has always been at the cutting edge of technology. We help our partners by offering the most innovative technology solutions, transforming their everyday tasks into smart experiences.

COMPANY

ZED Digital is a solely owned OHIO S-Corp founded in Columbus OH 2005. We are certified DBE by INDOT and WBENC certified woman-owned business with headquarters in Columbus- OH and satellite offices in Orlando-FL and Montreal-Canada. We have a staff of 20 people with a combined experience of 80+ years in the Transit industry. We have served over 100 clients.

QUALIFICATIONS AND HISTORY

ZED Digital has a unique competitive advantage compared to other Smart Mobility Software companies. Our MaaS mobility aggregation platform, called CloserLook Search®, has powered MaaS needs of several large implementations such as statewide multi-agency Multi modal Trip planner+Mobile Ticketing platform for MDOT and CDOT, Central Ohio Transit Authority, Ohio Department of Transportation, Transit Authority of River City (TARC), Greater Cleveland RTA. CloserLook Search® has successfully powered our MaaS and trip planner solution ZIG™, which has been used since 2017 by Transit agencies such as: Greater Cleveland Regional Transit Authority, Central Ohio Transit Authority, Transit Authority of River City (TARC, Louisville KY), and more recently Palm Tran (West Palm Beach FL).

ZED Digital is a Transit Technology company with over 25 years of custom software development and over 7 years of extensive experience in implementing cutting-edge solutions in transit technology, specifically specializing in AI Enabled Mobility as a Service and mobile ticketing solutions.

ZED Digital has a proven track record in developing and managing transit software solutions. We have 7+ years experience implementing Multi modal Trip planner +Mobile Ticketing solutions for major clients such as TARC, SEAT, GCRTA, ACRTA, BJCTA. We provide state-wide MaaS + Mobile Ticketing solutions for **Colorado Department of Transportation and Michigan Department of Transportation**, with a multi-agency solution in a single Multi modal Trip planner+Ticketing platform. The ZIG Multi modal Trip planner and ticketing solution proposed for BFT can be viewed in the video link below.

Our Mobile Ticketing solution has won international awards.

ZED Digital's Superwallet solution has not only been successful in delivering cutting-edge transit technology but has also been recognized internationally. The solution has received prestigious awards in the industry, highlighting its innovation, effectiveness, and impact on enhancing the transit experience for users.



ZIG Mobility as a Service app in 200+ cities.

We propose ZIG Mobility as a Service trip planner app capabilities currently available in 200+ cities in 45 states. The features of ZIG include:

Mobile Ticketing Capabilities

Purchase tickets for multiple modes in one app. Board with phone in pocket. Fully automated fare purchase and validation

Multi modal Trip Planner

Multimodal ticketing for all your modes in one app combines Fixed route, ADA/Paratransit, Microtransit, Demand Response. Obtain a real-time cost of your entire travel and **first/last mile** connection options to transit rides.

Realtime crowding data on vehicles

Our mobile app will inform your riders in real-time on vehicle occupancy and crowd levels.

Trip Origin/Destination Analytics

Our trip planner provides real-time boarding and alighting data for passengers. This data offers insights for route planning

Real-Time transit visualization on trips planned

View your bus arriving on a map and the ETA to your stop. Obtain notifications of delays in real-time

Find places, landmarks, attractions

Find your destinations and plan a ride within clicks. Obtain door to door directions.

Real-time generation of bus schedule

ZIG generates PDF documents of your schedules in real-time. This is a unique feature of ZIG.
No more outdated PDFs of your bus schedules.

ZED Digital has a unique competitive advantage compared to other Smart Mobility Software companies. We introduced the first hands-free ticketing solution in North America which provides Contactless, queueless and cashless ticketing.

- a. We provide hands-free ticketing – where rider fares and passes can be automatically verified as a person on boards the vehicle, with the phone in their pocket. This provides a seamless rider experience and interaction with County of Hawaii.
- b. Only **ADA** compatible device in the market.
- c. Our validators combine multiple validation modes **QR codes**, **Aztec bar** codes, **Bluetooth** and **NFC** validation integrated into a single **cell-phone** sized unit.
- d. Our mobile ticketing app provides automated ID verification for seniors/students/special fares.

The hardware and software combined solution proposed above has the following additional benefits to COUNTY OF HAWAII:

1. **OFFLINE PROCESSING**: Our validators can validate tickets even in case of limited or no Internet connectivity on rider mobile phones.
2. Our validators will provide the ability to purchase a ticket, display arrival info or alerts in an **offline** mode. They will use integrated WiFi hotspot to provide connectivity to riders who are offline.
3. Our validators onboard the vehicles provide a reliable approach to fraud detection to track fare evasion.
4. ZIG validators provide the real-time vehicle occupancy data to riders via the app. This is a COVID safety measure.
5. Validators alert riders of social distancing if they are too close to each other.
6. Sensors provide data to help drivers prioritize their order of inspection to avoid discrepancies.
7. Sensors automatically trigger real-time alerts about riders that ride past the destination within their permitted fare.
8. Sensors can enable the Agency to learn rider habits and preferences and personalize the rider experience in future or to make system improvements. For example validators can tell us how much time a user waits at a stop before they boarded.
9. The sensors will enable COUNTY OF HAWAII to deliver personalized messaging to each rider directly to their smartphone.
10. The in-built GPS in sensors provide location-based services with higher accuracy than relying on the GPS on user phones.

Description of Hardware Validators

Touchless features to increase safety and restore riders' confidence!

In 2018, **ZED Digital** was one of the first to successfully introduce a multi format validator that included

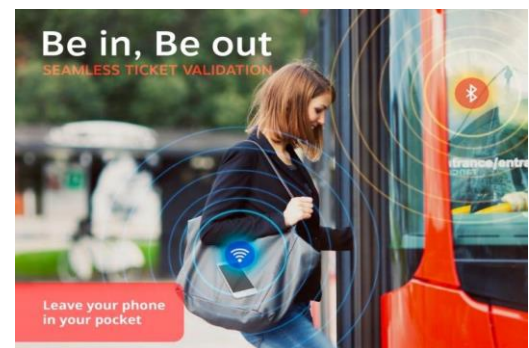
Internet of Things technology combined with traditional QR and Bar Code validation. Our validators are **fully patented** and can support all of the following modes:

- QR code validation
- Bar code validation
- Bluetooth validation
- NFC validation with phone
- NFC smart card validation
- *** New feature:** Contactless BLE for onboard credit card purchases by NFC tap, chip or swipe credit cards

Our validators ensure validation and usability with limited or no internet connectivity (Offline Validation).

The ZED contactless fare validation process is described:

1. Plan for a trip and purchase fares with the mobile ticketing app.
2. The rider decides if they would like to use the Bluetooth based automatic validator or if they would like to manually scan a QR code.
3. If the user selects QR code, they can activate the ticket on mobile app with a single click and view the QR code on their phone. The user can then scan the code on the QR code scanner provided on the validator.
4. In the automatic scan or Bluetooth mode, the mobile app notifies the users to turn on their phone's Bluetooth port.
5. The user then activates a ticket using a one-click action before boarding.
6. As the rider boards the vehicle, the Bluetooth validator on the bus will communicate with the rider's mobile phone and auto validate the ticket **while the phone remains in the user's pocket.**
7. The driver will see a **green light** on the sensor unit indicating a **valid ticket** or a **red light** indicating an **invalid one.**
8. In the case of **red light**, the driver can verify the authenticity of the ticket using visual validation: color of phone screen (red or green), the time remaining for the ticket to expire (ticking clock), the date and will see if it is a special fare (discount ticket).The driver can touch the phone screen to move the QR code to ensure it is not a screenshot.
9. **Touchless Next Stop request** to the driver from the mobile app. No more pulling chords or touching bus surfaces!
10. **Touchless SOS emergency request and alerts** to drivers and control rooms in case of health emergencies onboard

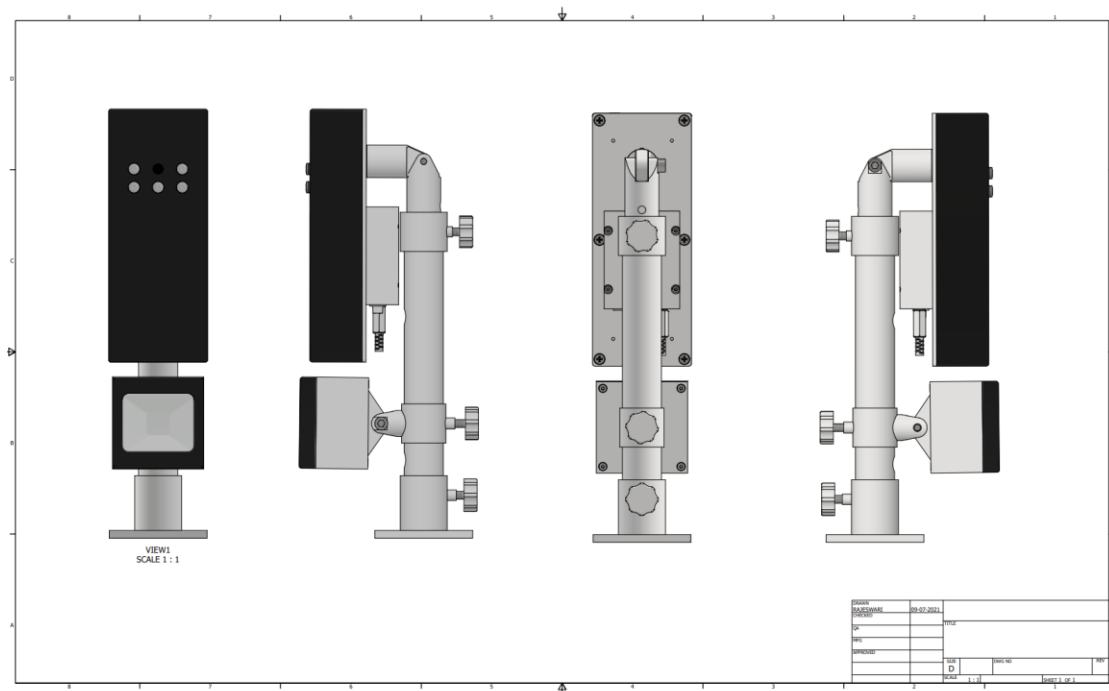


QR Code Scanner, NFC & Bluetooth

ZED's validator combines multiple technologies in a single unit.

- The sturdy design is vandalism proof.
- Customizable length power cables will be supplied to connect to the DC power outlet on the bus
- The power connection is built into the connector box on the back of the validator to prevent yanking or breaking.

- The chords are hidden inside the mounting pole at the back to prevent vandalism and are connected to the power supply on the bus from under the dashboard.
- The validators will be installed behind the farebox on the flat dashboard surface approximately midway between the doorstep and the driver.
- The range of the Bluetooth sensors will be limited to 2-3 feet around the farebox area to ensure accuracy of scanning.



Contact and contactless EMV (cEMV) payments (Open Payment)

Our validators have been recently enhanced to accept credit card payments onboard with a smooth magnetic stripe swipe path, durable EMV chip contact insertion slot, and fast EMV/NFC contactless tapping pad from contactless cards and most mobile wallets and wearables including Apple Pay, D-PAS, ExpressPay, Google Pay, MCL, PayWave, and Samsung Pay.

This enhanced feature will enable Metrolink to accept credit card payments directly onboard the coaches without the need to use the mobile app. Riders can swipe their credit cards directly on the validators to purchase a ticket.

ZIG DATASHEET

ZIG over-the-air Internet of Things based sensors connect seamlessly to smartphones to enable mobile ticket payment and validation.

- Supports bluetooth 4.0 and above
- NFC reader ISO 14443A
- Barcode Scanner
- WiFi integrated - 2.4 GHz
- Plug & play operation

SECURITY

- Encryption and security supports large scale deployments, prevents hijacking and spoofing

HARD SHELL ENCLOSURE

- Robust waterproof enclosure IP67, is perfect for indoor and outdoor implementations
- Screw to surface
- Mounting stand adjustable up to 2 ft

BUZZER & LED

- The integrated buzzer & LED alerts inspectors of invalid tickets. LED colors Red, Green, & Yellow



GPS Range : ~ 8 m

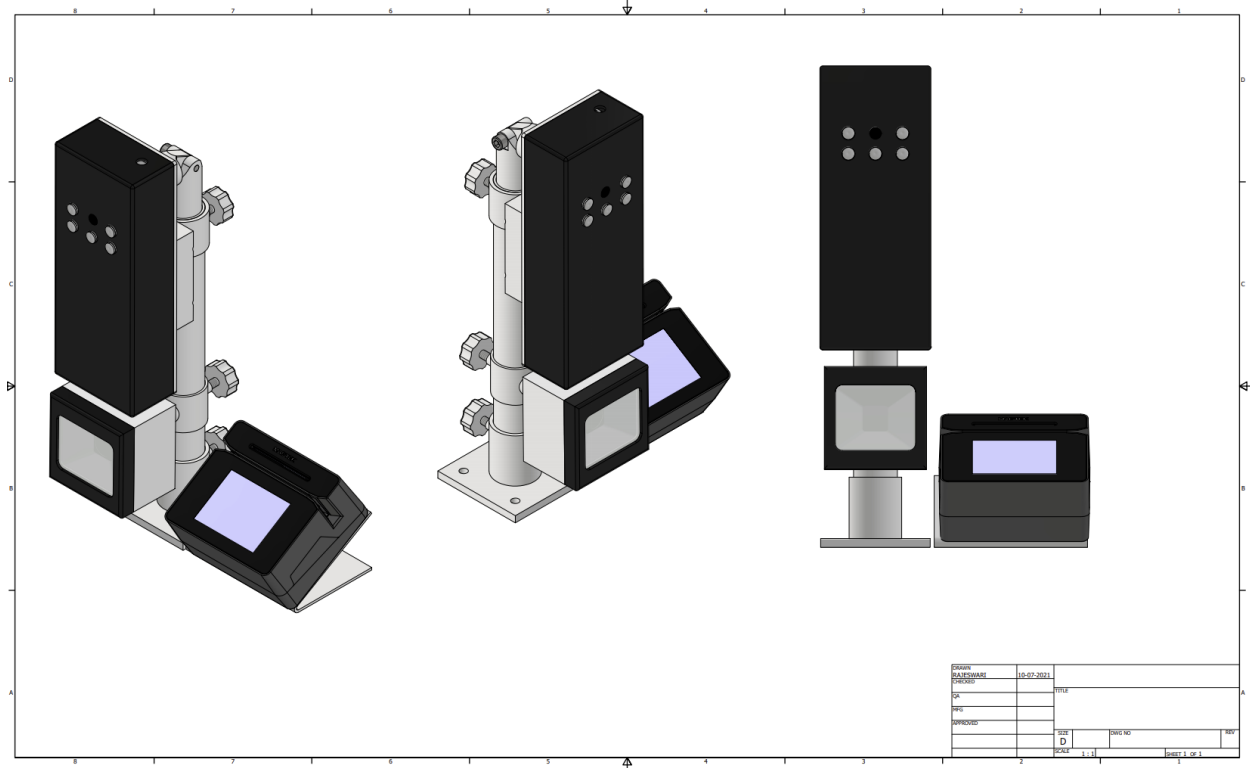
Input Voltage range : 12v - 80v DC

Consumption : ~1.45 mA





ELECTRONIC Validators With Contactless eMV (cEMV), QR Code Scanner, NFC & Bluetooth



OPTIONAL ALL DOOR BOARDING

Touchless Fare Collection with **All-Door Boarding**

ZED . digital

Touch-less boarding is a critical step in protecting frontline transit workers and riders. Have you considered adding a sensor-based validator hardware to enable a fully walk-in experience with rider phones in their pockets?

ZIG validators support multiple technologies including traditional QR code and cutting edge bluetooth, NFC technology. Bluetooth technology when combined with the mobile ticketing app enable passengers to board at any door with contactless ticket validation, with the phone in their pockets.

Our solution enables **handsfree boarding** by validating fares instantly as users board, without riders having to remove their smartphone from their bags, scan a QR code, or tap a card. Our **no-touch** sensor validators reduce boarding delays and increase rider safety.

1 How does all-door boarding work? Our ZIG validators can work on Bus or Rail. When installed near the **front or rear** door, the validators will communicate automatically with the rider's mobile phone through a Bluetooth connection and validate the ticket. A live visual display unit streams the boardings in real-time to drivers to identify fare evasion.

2 How do the validators help detect fare evasion? The validators auto-connect to rider smartphones and therefore are not dependent on rider action to validate their entry. The sensors provide accurate count of the number of passengers who board versus the number of mobile tickets validated. Fare inspectors and drivers can view real-time data to rapidly identify passengers with unverified tickets.



3 What is the accuracy provided by the validators? The validators can work in automatic or manual validation modes. In automatic mode, the phone automatically connects with the rider's phone using a bluetooth connection. In manual mode, the user scans their phone on the built-in QR code scanner. The accuracy of the validators in auto-validating tickets is 98%. The built-in NFC scanner can be used to scan a smart-card. The driver can also verify the authenticity of the ticket with visual validation methods: the color and animated QR code, the expiry date count down by seconds, special fare status, and touch screen validation to ensure it's not a screenshot.

Auto senses boarding, eliminates touching validators

Seamless, hands-free user experience

No boarding delays or lineups near fare boxes

Can process multiple users at once

Obtain origin & destination data for rider trips

4 Does the driver need a display?

The optional display consists of a smartphone or tablet that is placed near the driver. The display is optional for front door boarding but is recommended for rear-door entries. The driver sees a live stream of each passenger and also the user and ticket information for each boarding.

5 Does the rider need Internet on smartphones to board?

Our validators allow riders to board in offline mode to validate tickets.

6 Can you integrate the sensor features with an existing app?

Yes. The ZIG solution comes with a mobile ticketing app to enable integration without extensive development. Do you have an existing mobile-ticketing app? No problem! Our validators can be rapidly integrated to your existing apps using our APIs.

7 What is the technology used by the validators?

Our hardware validators support multiple technologies: QR/bar code scanning, BLE and NFC technology. In the BLE mode, the validators support completely hands-free boarding. The validators are approximately the size of a cell phone and weigh less than 3 lbs.

8 Do the validators support all smartphones? At what range can the BLE validators connect with phones?

QR/bar code mode is supported on all smartphones. Our BLE has been tested to connect on 2012 model or newer phones. The range can be customized from a few inches to over 40 feet and is tailored to your specific transit and vehicle needs.

9 How long it takes to implement the solution?

The validators are plug-and-play can be self-installed. The entire solution including your mobile app can be implemented within weeks.

10 Do the validators need to be integrated to existing onboard equipment?

Onboard integration is optional. Our validators can work completely **stand alone**. Any integration for reporting purposes can be done via the backend systems to reduce costs and installation time.



..... contact - info@zed.digital

VALIDATOR ANALYTICS

ZIG offers unique analytics that combines all mobility options, including public and private transportation modes. **ZIG** is the only tool to provide such deep analytics for public and private modes combined in a single device.

- The data is available in **real-time**.

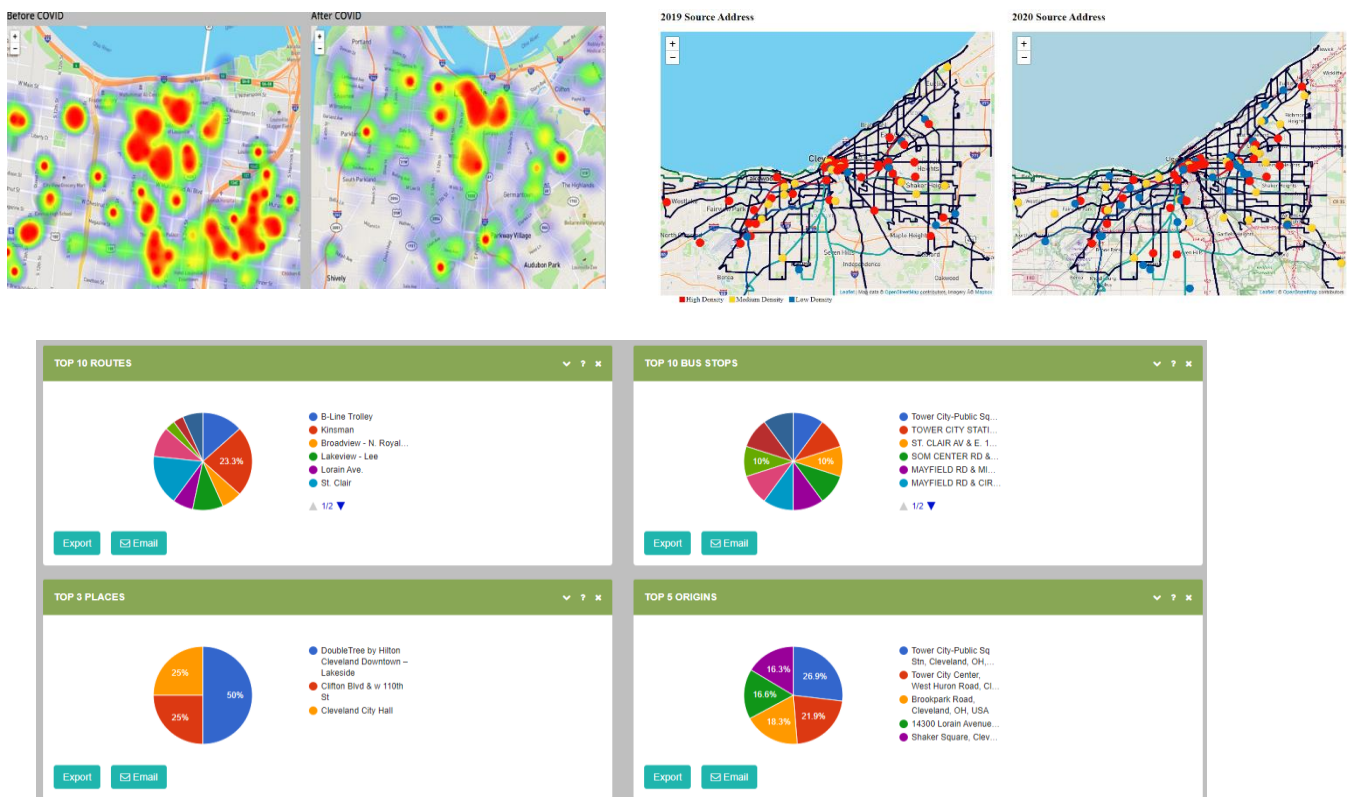
Transit agencies know that reducing ride times and wait times, developing a reputation of reliability, and offering a safe service are critical for both the rider experience and enticing new riders to use the system.

ZED's Approach is to use Big Data Analytics to understand rider expectations. Our Data Analytics platform helps you keep up with, and surpass, rider expectations.

Assess real-time data on rider wait times, overall ride times, and headways across all routes. This will allow you to quickly identify potential pain points for your riders, and areas of improvement for your service.

The post pandemic route optimization changes need to cater to a changing work schedule as well as origin and destinations of trips. To this end, our solution delivers Origin/Destination analytics and heatmaps to help track the changes in rider commuting habits. This data will help tailor the solution to changing rider needs in a post pandemic world.

Heatmap, charts of rider trip origin/destination changes during and after Pandemic



APPENDIX