Mobile Hotspot Playbook

CALIFORNIA STATE TRANSPORTATION AGENCY | JULY 2020

TABLE OF CONTENTS

1. Purpose and Opportunities
2. Key Takeaways
3. WiFi Bus Proof of Concept Summary
4. Technology
5. Operations
6. Locations – things to consider (parking, tree line)
7. Outreach & Partnerships – app, email lists, flyers, groups, events
8. Acknowledgments

PURPOSE AND OPPORTUNITIES

Broadband access is a critical and increasingly essential part of our daily lives. We use it to communicate with loved ones and coworkers, to watch TV, to shop, to create music, and to accomplish countless other tasks that would have seemed unfathomable only a generation ago. With a broadband connection, a world of information and possibilities is always just a few taps or clicks away.

The opportunities that come with a reliable broadband connection – and the inverse – has become even more striking amid the COVID-19 pandemic. In a matter of weeks, the pandemic upended our lives in ways big and small. It changed how and where we work, learn, visit with our doctor, and conduct daily tasks. There was a sudden expectation that everyone should be able to continue to function exclusively via the internet. It also forced us to reckon with the reality that not everyone has access to a quality broadband connection. Approximately one in five students in California lack high-speed internet access and nearly half of all low-income households in the state do not have broadband service at home.

The convergence of an immediate need for additional broadband connections and the sudden availability of transit buses due to decreased ridership and the number of transit routes being offered led to the creation of the mobile hotspot proof of concept. The idea was to equip unused transit buses with wireless communications technology to act as mobile hotspots for citizens to conduct normal business while staying at home or setting up near the bus in a physically distant manner. We used the resources at hand to help solve an urgent problem in the community.

A transit bus (or school bus, bookmobile, paratransit vehicle, food truck, etc.) equipped with internet access and the ability to send that signal beyond the vehicle have the potential to help the local community in several ways. Additional non-passenger transport use cases possible during both emergency and non-emergency situations could include:

> ➢ emergency response (transporting citizens away from disaster locations, base camps near wildfires, earthquake zones, etc.)
> ➢ mobile communications center (can augment communications at wildfire base camps, field hospitals, field operations centers, etc.)
> ➢ hotspots for outdoor activities/events (potential outdoor classrooms, sports events, concerts, fairs, etc.)

KEY TAKEAWAYS

Providing free, reliable high-speed internet to communities in need and bridging the digital divide, particularly during a time of crisis, is an undeniably noble and worthwhile pursuit. Coupled with repurposing existing resources, such as transit buses, and buy-in from technology partners, this proof of concept highlights the best of public-private partnerships. However, no matter the merits or ingenuity, such a project cannot achieve its desired impact or reach its full potential without proper planning and strong community engagement.

Technology
- ✓ Include SIM cards from more than one carrier in each vehicle
- ✓ Use different technology and equipment designs based on the specific location
- ✓ Make accessing the network simple, intuitive and uniform and available in multiple languages

Operations
- ✓ Train drivers on the equipment and purpose of the program so they can be helpful troubleshooters and ambassadors
- ✓ Ensure parking permits/agreements are in place before program launches

Locations
- ✓ Scout potential locations to confirm they can adequately accommodate the bus and ensure there are no impediments that would severely limit the signal range
- ✓ Create partnerships to serve prescheduled events (farmer's market, food distribution, Census, etc.) that effectively reach target audience
- ✓ A routine schedule makes it easier for potential users to locate hotspots at a given day and time

Outreach
- ✓ Bring in trusted community leaders early on to help design an outreach program that fits the needs of the target audience
- ✓ Leverage the connections of project partners for a multifaceted communications strategy that goes beyond traditional and social media
- ✓ Don't overly rely on information online, since the target audience might not be able to access it
- ✓ Use distinct, high-visibility signage to help identify the hotspot

With these factors in place, it is CalSTA's belief that similar projects can be a successful part of an innovative strategy to bridge the digital divide for a variety of different use cases in both emergency and non-emergency situations throughout the state.

WiFi Bus Proof of Concept Summary

To test the effectiveness of a mobile hotspot program, CalSTA asked the City of Sacramento (the City) and the Sacramento Regional Transit District (SacRT) to jointly create a mobile hotspot proof of concept (POC) for 60 days. The POC was officially called "The WiFi Bus."

SacRT agreed to provide 10 buses for the POC as well as their operations center staff and drivers to carry out the program. Their staff worked with the appropriate unions to ensure compliance with all labor agreements during operation of the POC. SacRT also designed the website and digital media toolkit that was used across all social media channels.

The City worked with community partners including Valley Vision, local school districts, and the Sacramento Public Library to identify digital deserts and ideal parking locations for the buses with a focus on bridging the digital divide and serving K-12 students as they transitioned to distance learning. The local police and public health departments also were consulted to ensure public health and safety standards could be maintained.

The POC officially launched with three buses on May 4th and fully launched with all 10 buses on May 11th. Each bus parked for 3.5 hours at a time at two locations seven days a week to provide broadband service to the surrounding locations while people remained in their homes or congregated at safe distances.

Buses were equipped with several technology designs by AT&T, Verizon Wireless, T-Mobile, Aruba, a Hewlett Packard Company, Cradlepoint, and Sierra Wireless. The varied proposals offered an opportunity to determine how different communities could benefit from the different designs. All designs were Child Internet Protection Act (CIPA) compliant.

To access the network, residents had to follow three simple steps using a computer, tablet or mobile device:
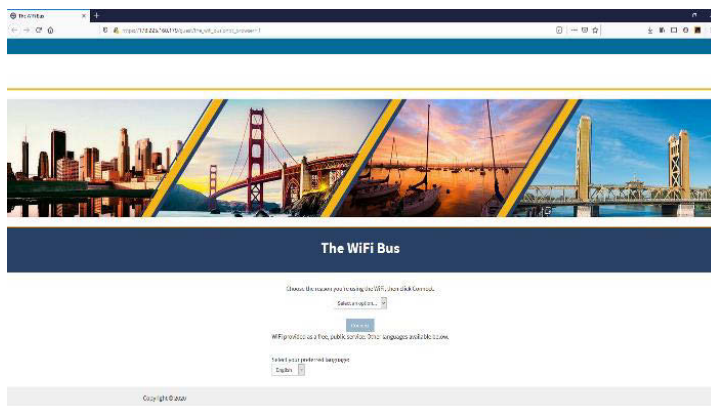
1. Locate the "WiFi Bus" network

2. Select a purpose for the access (School, Work, Personal)

3. Click Connect and be automatically redirected to the Sacramento Public Library homepage.

All locations and times for the buses were accessed through http://thewifibus.com which was regularly updated with the latest information. Symsoft Solutions, LLC created an app called Wifi Bus Sacramento that also tracked the bus schedules.

WiFi Bus Social Media Image

WiFi Bus Sacramento App Image

During the POC, a total of 1,634 users engaged with the network. Of those users, 67% said they joined for personal use, 23% for work, and 10% for school.

Anecdotal user feedback was generally good regarding the availability of the hotspots. We heard that the buses were helpful considering the communities were trying to conduct all daily tasks from home, which is difficult to do without reliable internet service.

Some users expected more services beyond wireless internet. For example, when buses parked at libraries, people expected to get the same services they usually get at the library – computer terminals and printing services. We also heard from a lot of people who wanted to print out tax forms.

Finally, we were not able to solve for the lack of devices which also impacted use.

TECHNOLOGY

For the POC, two technology designs were tested on the buses. These designs have different advantages and price points from which cities and transit agencies can choose the right fit for their communities. For this POC, the project partners donated all the necessary equipment.

Both designs included the appropriate equipment to hold multiple SIM cards and provide unlimited data plans. The POC received multiple SIM cards from AT&T, Verizon Wireless, and T-Mobile. It is important to include SIM cards from more than one carrier in each bus as not every carrier has a strong connection in every community and the routers are able to easily detect and switch to the SIM card with the strongest signal. The signals were intended for outdoor use. Residents living nearby likely would have to go outside to access the network.

The equipment does not remain outside the bus while it is in transit, so it must be reinstalled at each location. This made it possible to easily adapt the technology for each specific location to maximize the wireless coverage.

Design A – utilizing a signal extender

Design A utilized signal extenders that allowed the signal to travel outside the bus for up to 1,800 feet barring obstacles. This use case could allow for the bus to park in a large parking lot and provide service for people in many cars. It could also allow for students to spread out in an outdoor classroom, firefighters to safely access the internet and phone service while physically distancing at a wildfire base camp, or citizens to do the same at an outdoor festival or concert. There are many potential use cases when the signal can reach a large area.

Design B – without a signal extender

For communities or use cases that don't need to reach as large an area, Design B still sent a signal out up to 500 feet. This use case could accommodate locations that serve a smaller number of people – smaller outdoor classrooms, pass-through events such as Census events or check-in areas, or for outdoor shows where the area of concern is only the technology required for the performance. Again, there are many potential use cases for this type of set up.

Customer Experience

The primary consideration for design of the consumer experience should be that it is seamless. Aside from range, an individual would not be able to tell a difference regardless of which technology design was installed on the bus. All the buses were equipped with an Aruba ClearPass Policy Manager to act as a

single authentication point and unify the sign on experience. Aruba created a sign-on page – available in a number of different languages – where customers would choose their purpose for visiting the network: School, Personal, or Business. After making their choice they would automatically land on the Sacramento Public Library website homepage.

The bus can also connect to an existing network via an ethernet cable which creates a strong, stable signal for the bus to push out. Most likely locations to accommodate this set up would be schools and libraries.

Below is an example of how the system works, provided by Aruba, a Hewlett Packard Company.
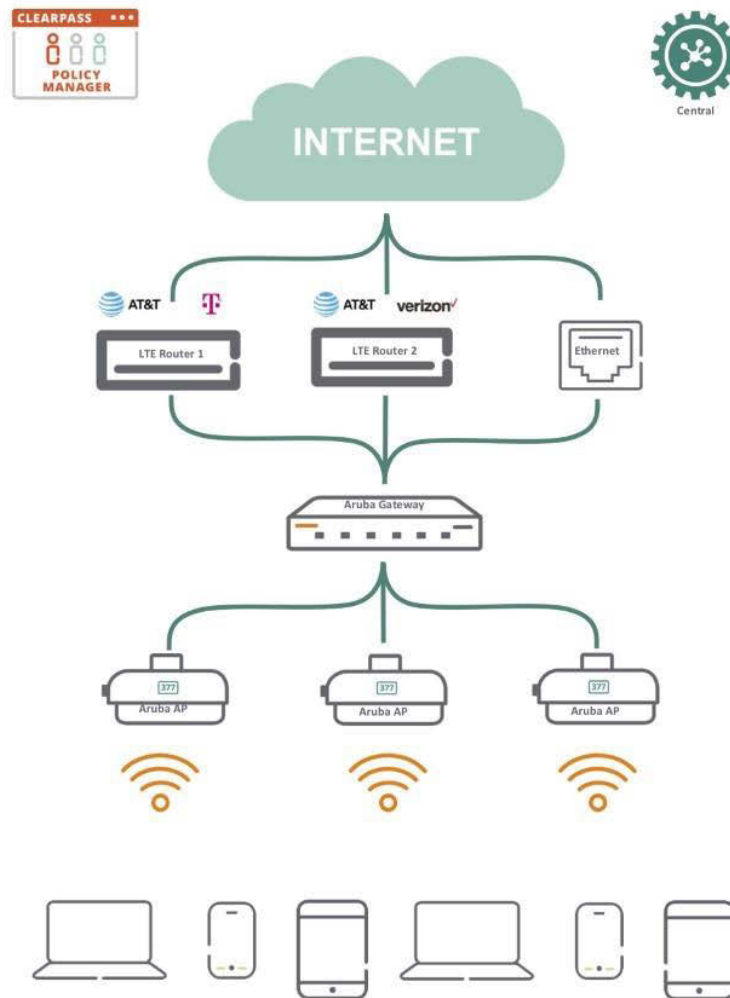
OPERATIONS

The operation of the bus and program is centered around the transit agency staff and drivers. Transit operations staff determine if the preferred locations are safe and secure for their drivers and buses and create the schedules according to agreement with the labor unions.

In preparation for the program, the equipment vendors train transit staff and drivers how to set up the technology once the buses are parked on site and how to store it on the bus. It is also vital for transit agency staff to inform bus drivers the purpose of the program, expectations from drivers in setting up the technology and what to do once at the site, and who to call in case of equipment failure.

While on site, drivers will have to set up the technology (which takes up to 20-30 minutes), display any signage as agreed upon with the program partners, and be prepared as to how to interact with the public. This could mean simply advising that the drivers don't have additional information but notifying residents of the customer service number to assist with any issues. Drivers can be helpful ambassadors for the program, so proper training and knowledge of the program is vital.

LOCATIONS

It is important to determine the target beneficiaries of the program – generally addressing digital deserts and/or specific events or situations – and choose locations to reach that target audience.

For generally addressing digital deserts, there are certain conditions that should be taken into consideration. Many community organizations and school districts already have insight into the areas with the greatest need for expanded broadband services – highlighting the importance of strong local partnerships when determining locations. Teaming up with other organizations, like a farmer's market, food distribution, or Census site, also provides a natural bridge to residents who could most benefit from the service.

For this POC, the most common locations were schools, parks, and libraries. It is highly recommended to conduct testing in advance to ensure the location can adequately accommodate a 40-foot bus (or however big the chosen vehicle happens to be) and ensure there are no impediments that would severely limit the wireless range. Other important factors to consider are:

- Parking permits/agreements
    - o It's important to work with the preferred locations early in the process in order to create any contractual agreements needed to ensure safe parking for the buses.

- Parking location
    - o Flat parking surfaces are ideal. This allows the signal to extend farther than if the bus is parked next to a curb and is slightly tilted.
    - o Consider the surrounding area from where the bus is parked. Buildings, trees, and other obstructions can break the signal.
        - ▪ During the POC, we found that putting the signal extenders on the side of the bus near the roof but not on top of the bus allowed the signal to travel below the tree line, extending farther than if the extenders had been placed on top of the bus.

OUTREACH & PARTNERSHIPS

The key to a successful program is developing strong partnerships and raising awareness within the community. Those who need this service may trust their neighbors and community leaders more than government entities. Therefore, it is critical that community leaders are brought into the program early to help design an outreach program.

Because of the lack of reliable high-speed internet, the target audience likely will be hard to reach through conventional means. Therefore, outreach methods must be multifaceted and go beyond traditional and social media with the choice of messengers carefully considered. Forms of outreach that should be considered include email, flyer distribution, direct mailings and letters, and speaking at community events. Project partners should reach out to their networks via the most effective manner.

Communications strategy

CalSTA partnered with the City and SacRT on a communications strategy to leverage the collective media contact network to spread the word about the POC and ensure maximum press coverage so as many residents as possible could learn about the project through traditional news outlets. The group issued a joint press release on May 1st that produced news stories in the Sacramento Bee and the major TV stations in Sacramento. The POC garnered further press coverage with a socially distanced media event on May 4th that included the City's mayor and local school district superintendent.

We also worked with the technology partners to connect with industry trade publications as another form of promoting the project. While this likely did not help reach the target audience, it was a nice way to recognize project partners in publications read by their peers and supported a strong relationship, which is fundamental to a successful project.

On social media, we collaborated with the City and SacRT on a digital toolkit that we shared with other POC partners to ensure consistency in messaging, information and branding across platforms and accounts. The partners typically posted about the WiFi Bus at least once a week to ensure their followers received a steady stream of information about the project.

Outreach challenges

Among the challenges of traditional and social media campaign was that the call to action – learn more about the project, get the latest WiFi Bus schedule, etc. – was sending potential users, who likely would not have reliable internet

access, to a website. Social media, by its very nature, requires an internet connection to access. Similar challenges exist with online community forums like Nextdoor, which typically are ideal platforms to connect with specific neighborhoods.

Without a consistent weekly schedule as the project worked on finding the best locations during the initial weeks of the POC, there was no easy way of learning the location of a bus on a given day without internet access. This was addressed as the project progressed by moving to a consistent weekly schedule, teaming up with organizations that had prescheduled events (farmer's market, food distribution, Census, etc.) and the introduction of the mobile app, which allowed users, while connected to the WiFi Bus network or another internet source, to download the schedule to access later without an internet connection.

<u>Signage and visibility</u>

The 10 transit vehicles had signs in different areas of the bus and a display of "The WiFi Bus" where route information would normally go so that it could easily be identified as a mobile hotspot. In addition, A-frame poster stands were placed outside the vehicle with information on how to sign on and access the network. The signage, displays and posters helped increase the visibility of the buses and pique the interest of passersby to inquire about its purpose. This added to the "word-of-mouth" aspect of spreading information within communities where the buses were located. Signage was also beneficial at locations where the WiFi Bus complemented another service, such as food distribution.

Acknowledgments

CalSTA would like to thank all of its POC partners, but especially those who contributed in-kind labor, equipment, and creativity: