METROLINK WI-FI REVERSE PITCH

Technical Supplement

APRIL 29, 2020

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METROLINK
WI-FI REVERSE PITCH

METROLINK PILOT PROGRAM
Equipment Installation and IT Performance Data

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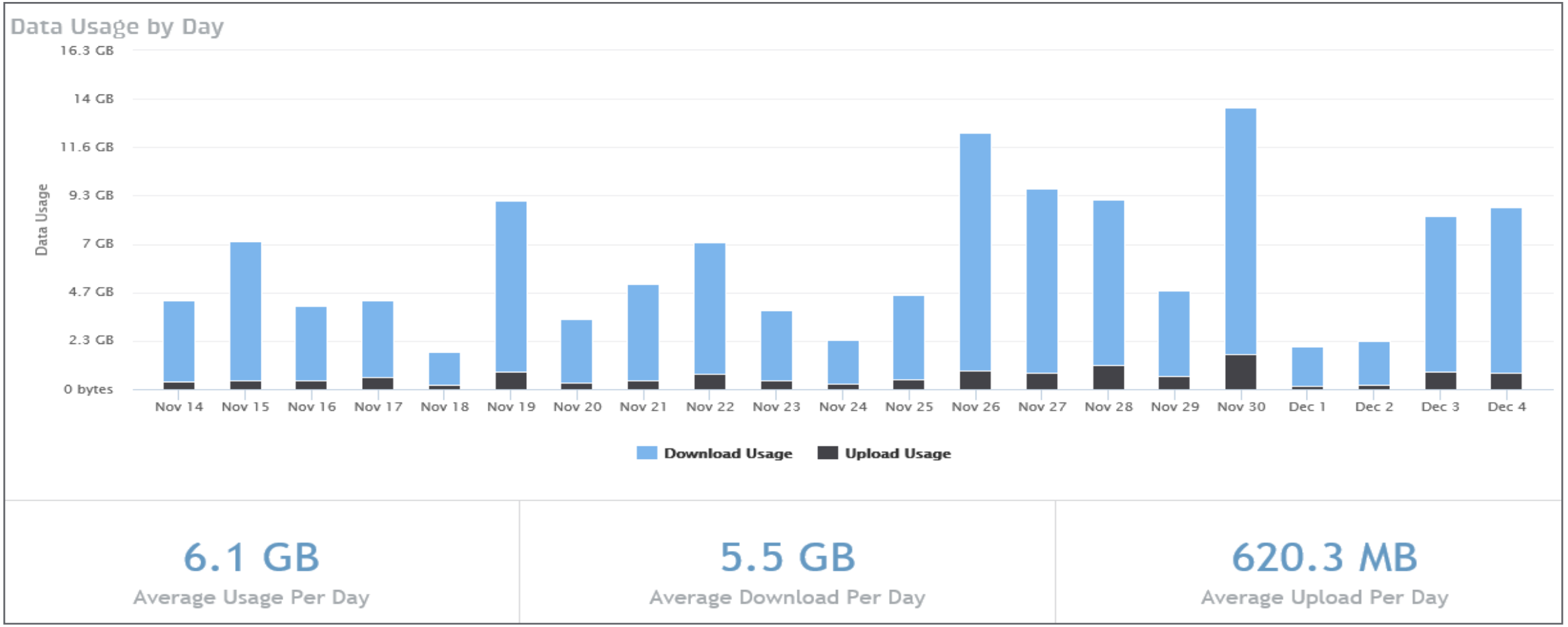
Data Usage

Pilot #1

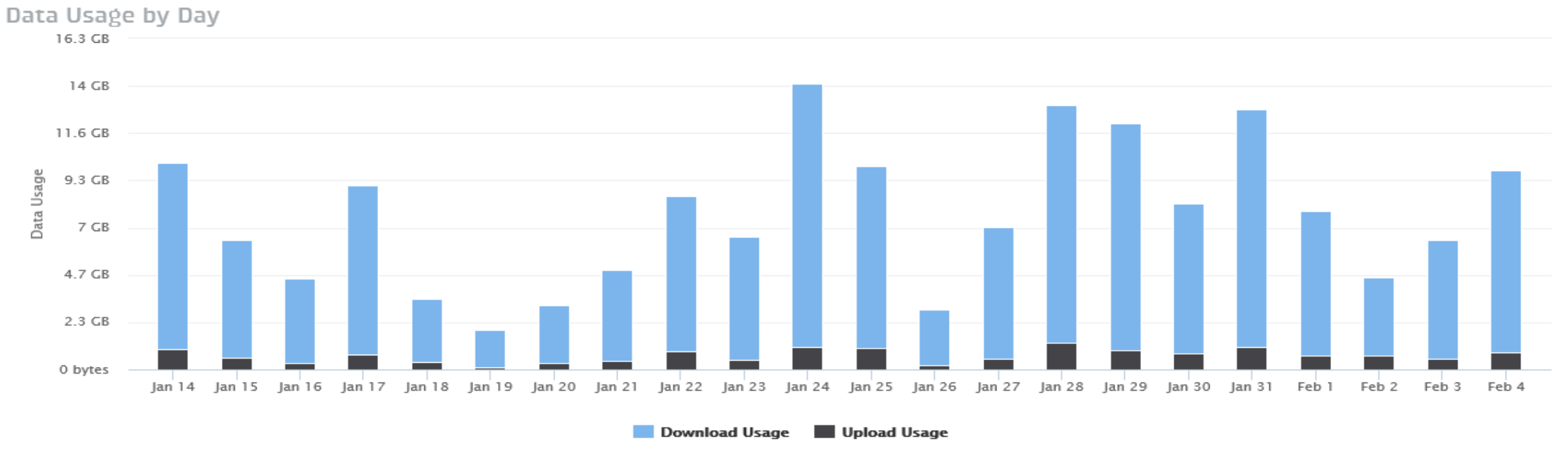


6.1 GB	5.5 GB	620.3 MB
Average Usage Per Day	Average Download Per Day	Average Upload Per Day

METROLINK

Data Usage

Pilot #2



7.6 GB	6.9 GB	698.4 MB
Average Usage Per Day	Average Download Per Day	Average Upload Per Day

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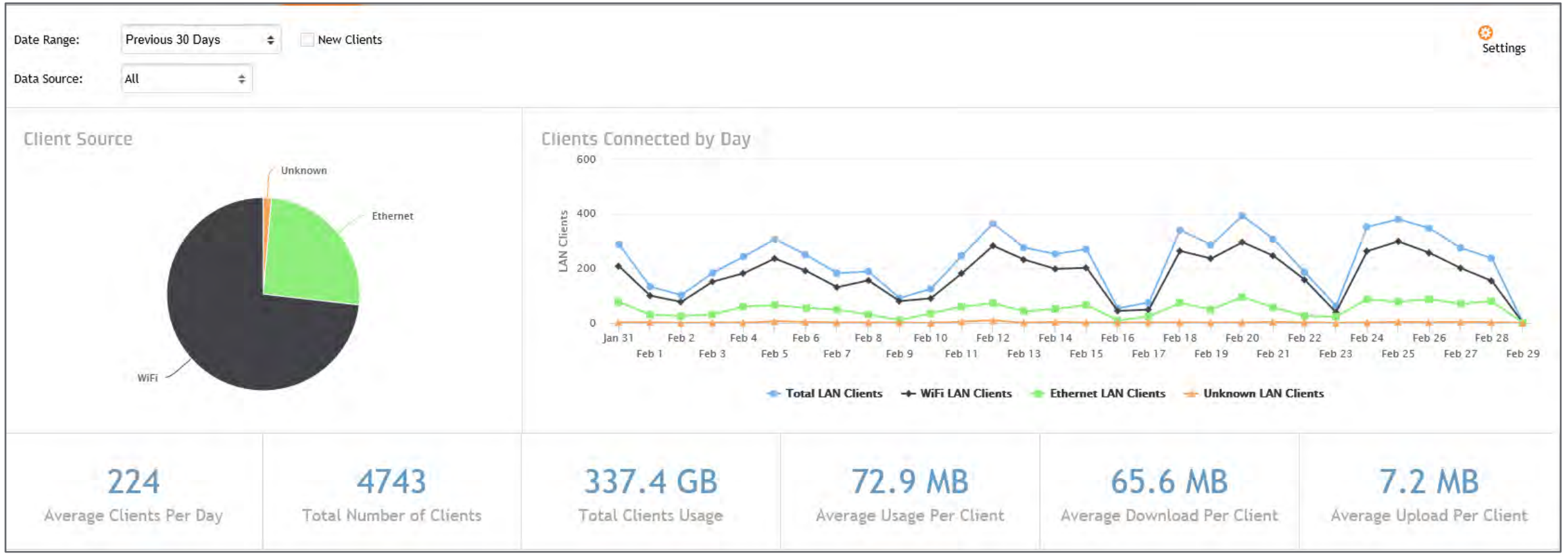
Data Usage and Connection Metrics by Day



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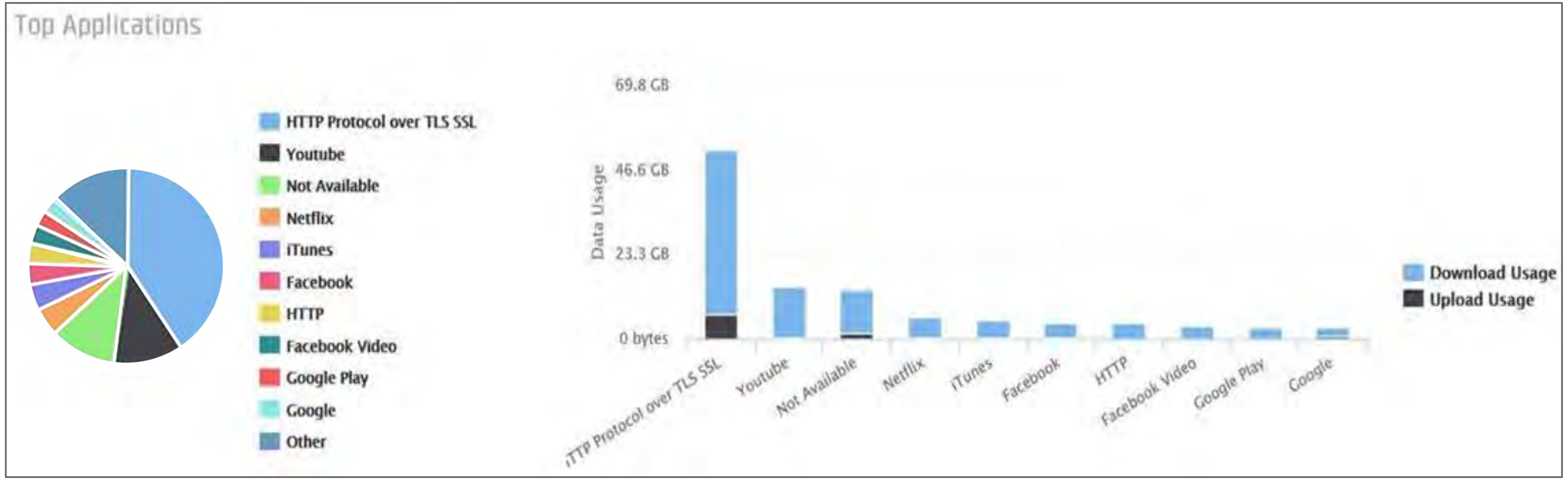
Top Applications Based on Data Usage

Pilot #1



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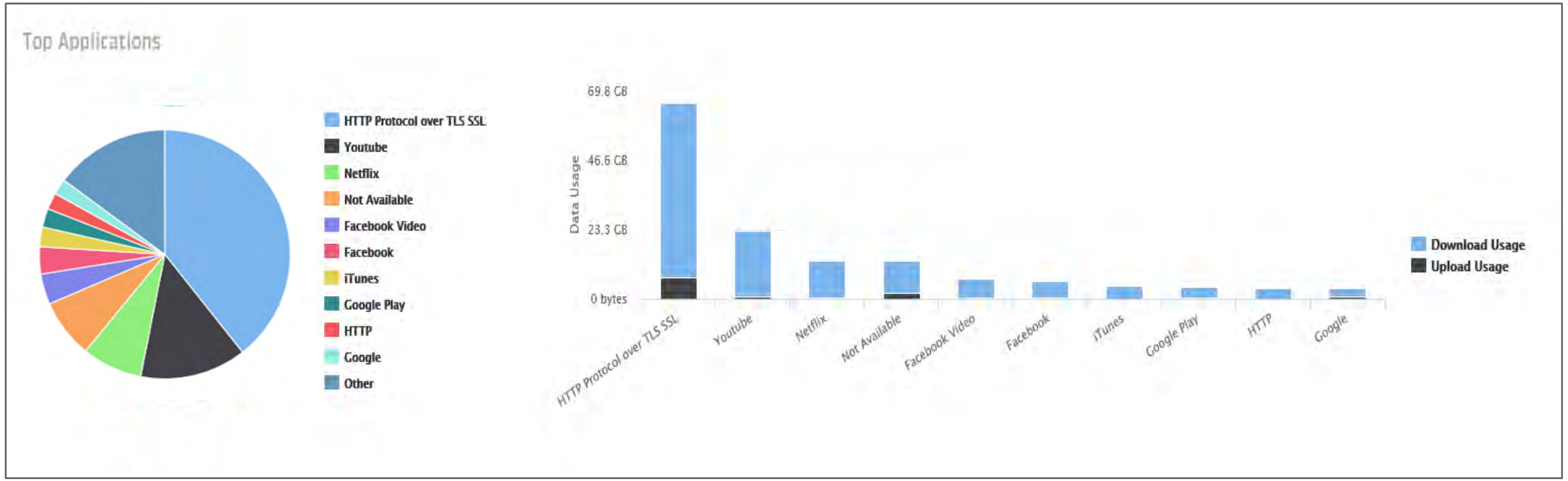
Top Applications Based on Data Usage

Pilot #2



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External Antennas										
	Date	Data QoS %	Total Data (Mb)	Data UL (Mb)	Data DL (Mb)	Connection Attempts	Data Sessions	Dropped Connections	Total Blocked Connections	Total Block %
Tue	2/25/20	95.34	901	178	723	2769	2769	0	129	4.66
Mon	2/24/20	96.37	2,326	268	2,058	2669	2669	0	97	3.63
Sun	2/23/20	99.49	1,404	119	1,285	2926	2926	0	15	0.51
Sat	2/22/20	98.92	616	72	543	2953	2953	0	32	1.08
Fri	2/21/20	96.18	1,342	148	1,194	2852	2851	0	109	3.82
Thu	2/20/20	90.55	968	87	881	2413	2413	0	228	9.45
Wed	2/19/20	98.7	890	182	709	1840	1840	0	24	1.3
Tue	2/18/20	93.02	1,420	133	1,287	1834	1834	0	128	6.98
Mon	2/17/20	98.04	1,874	178	1,696	2196	2196	0	43	1.96
Sun	2/16/20	99.23	246	19	227	2342	2342	0	18	0.77
Sat	2/15/20	99.38	2,392	184	2,208	2564	2564	0	16	0.62
Fri	2/14/20	94.84	471	63	408	2557	2557	0	132	5.16
Thu	2/13/20	96.6	1,072	99	974	2824	2824	0	96	3.4
Wed	2/12/20	95.42	2,040	284	1,757	2728	2728	0	125	4.58
	Average	**97**	**1,283**	**144**	**1,139**	**2,533**	**2,533**	**0**	**85**	**3.42**
	Date	**Data QoS %**	**Total Data Volume (Mb)**	**Data UL (Mb)**	**Data DL (Mb)**	**Connection Attempts**	**Data Sessions**	**Dropped Connections**	**Total Blocked Connections**	**Total Block %**
Tue	2/25/20	94.68	5,274	482	4,792	2632	2632	0	140	5.32
Mon	2/24/20	97.04	1,064	85	979	1757	1757	0	52	2.96
Sun	2/23/20	91.31	0	0	0	587	587	0	51	8.69
Sat	2/22/20	74.61	1	0	0	319	319	0	81	25.39
Fri	2/21/20	88.63	1,949	186	1,762	1521	1521	0	173	11.37
Thu	2/20/20	91.11	5,581	478	5,103	2138	2138	0	190	8.89
Wed	2/19/20	95.07	1,039	73	965	2574	2574	0	127	4.93
Tue		98.39	7,229	809	6,420	2739	2739	0	44	1.61
Mon	2/17/20	95.22	68	12	55	1778	1778	0	85	4.78
Sun	2/16/20	100	0	0	0	683	683	0	0	0
Sat	2/15/20									
Fri	2/14/20	92.57	1,301	100	1,200	2195	2195	0	163	7.43
Thu	2/13/20	98.13	3,625	364	3,262	2189	2189	0	41	1.87
Wed	2/12/20	95.11	2,700	343	2,357	1779	1779	0	87	4.89
	Average	**93**	**2,295**	**226**	**2,069**	**1,761**	**1,761**	**0**	**95**	**6.78**
Total External		**94.96**	**1,770**	**183**	**1,587**	**2,161**	**2,161**	**0**	**90**	**5.0**

Internal Antennas										
	Date	Data QoS %	Data Volume (Mb)	Data UL (Mb)	Data DL (Mb)	Connection Attempts	Data Sessions	Dropped Connections	Total Blocked Connections	Total Block %
Tue	2/25/20	98.48	4,751	492	4,259	1903	1903	0	29	1.52
Mon	2/24/20	97.48	3,209	269	2,940	1946	1946	0	49	2.52
Sun	2/23/20	100	0	0	0	84	84	0	0	0
Sat	2/22/20	96.76	1	0	1	1731	1731	0	56	3.24
Fri	2/21/20	99.56	2,067	146	1,921	2060	2060	0	9	0.44
Thu	2/20/20	97.49	2,092	169	1,923	2153	2153	0	54	2.51
Wed	2/19/20	97.08	2,648	225	2,423	2121	2121	0	62	2.92
Tue	2/18/20	96.03	934	100	834	2492	2492	0	99	3.97
Mon	2/17/20	92.19	164	10	154	1613	1613	0	126	7.81
Sun	2/16/20	94.09	0	0	0	948	948	0	56	5.91
Sat	2/15/20	88.95	0	0	0	787	787	0	87	11.05
Fri	2/14/20	97.1	1,275	163	1,111	2554	2554	0	74	2.9
Thu	2/13/20	96.51	1,184	154	1,030	2289	2289	0	80	3.49
Wed	2/12/20	94.81	1,109	89	1,020	2641	2641	0	137	5.19
	Average	**96**	**1,388**	**130**	**1,258**	**1,809**	**1,809**	**0**	**66**	**3.82**
	Date	**Data QoS %**	**Data Volume (Mb)**	**Data UL (Mb)**	**Data DL (Mb)**	**Connection Attempts**	**Data Sessions**	**Dropped Connections**	**Total Blocked Connections**	**Total Block %**
Tue	2/25/20	94.54	353	61	291	2273	2273	0	124	5.46
Mon	2/24/20	98.52	3,132	492	2,639	2362	2362	0	35	1.48
Sun	2/23/20	99.05	1,021	141	880	2215	2215	0	21	0.95
Sat	2/22/20	99.35	2,109	138	1,971	2464	2464	0	16	0.65
Fri	2/21/20	97.48	468	38	430	2420	2420	0	61	2.52
Thu	2/20/20	92.18	997	135	862	2200	2200	0	172	7.82
Wed	2/19/20	96.5	469	48	421	1742	1742	0	61	3.5
Tue	2/18/20	94.15	478	38	441	2340	2340	0	137	5.85
Mon	2/17/20	96.37	232	16	216	1735	1735	0	63	3.63
Sun	2/16/20	98.32	0	0	0	654	654	0	11	1.68
Sat	2/15/20	93.35	2,504	288	2,215	2060	2060	0	137	6.65
Fri	2/14/20	95.65	572	124	448	1860	1860	0	81	4.35
Thu	2/13/20	96.24	850	123	727	1860	1860	0	70	3.76
Wed	2/12/20	92.64	1,041	117	924	2582	2582	0	190	7.36
	Average	**96**	**1,016**	**126**	**890**	**2,055**	**2,055**	**0**	**84.20**	**3.98**
Total Internal		**96.10**	**1,202**	**128**	**1,074**	**1,932**	**1,932**	**0**	**74.89**	**3.90**

Employee Ideas to Use Wi-Fi

We asked Metrolink employees how Wi-Fi could help us best serve our riders or operate more efficiently. These were their emailed responses.

SAFETY & SECURITY:

The two proposed uses for Wi-Fi would have been my suggestions, as well. Passenger counts can easily be taken with the use of Raspberry Pi and occupancy sensors. I would further recommend that the Security Operations Center (SOC) or Dispatch Chief could observe the passenger compartments of the trains through the security cameras for assistance with reports of unruly passengers in the case that the crews are unable to provide specific details due to actively dealing with said passengers.

Just a quick note from an IT security perspective, we need to let riders know it's (highly) recommended they use a VPN solution whenever they use an open Wi-Fi network. I see no mention of VPN in our communications with riders.

Whether it is through creating a cloud where people connected to the Wi-Fi can share photos/videos of suspicious/disruptive/unsafe activity to eventually being able to record and stream directly from within the cars to the SOC for review.

I think having a number or a link on the Wi-Fi to connect to 911 in case of any disturbance or emergency where the passengers are not able to reach the conductor would be very helpful. This will be in line with our motto of Safety first. I feel the passengers would really appreciate and feel safe by having that. Although we have the emergency alerts going out to passengers, we can have it sent thru Wi-Fi if possible.

In our homes, Wi-Fi powers our security systems – could we integrate better security on our trains through Wi-Fi?

Can there be a way for riders to Alert someone to a security issue through the Wi-Fi portal?

It seems like there has been an increase in activity on board our trains with unruly passengers, and passengers in medical distress. To enhance safety and security on board our trains perhaps it would be possible to surveil our trains through some kind of Wi-Fi feed? I have no idea whether or not it is possible but a live feed from our trains might be a feature to help our riders feel more secure.

Remote Trespasser Monitoring – I understand we have head-end cameras but unfamiliar with their zoom capability. Perhaps install a high zoom camera on the ends of the trains to identify trespassers and allow engineer to react sooner. A camera like Nikon COOLPIX P900 can see a bird 1 mile away as if it were only 30 feet away, Wi-Fi could allow remote monitoring and control of that camera. The intent is to avoid trespasser strikes.

Drone – depending on the Wi-Fi technology (track-side or onboard) it's possible to control a drone remotely to fly ahead of the train for similar purposes of identifying trespassers or debris. I understand similar drone technology is used to survey tracks as well.

In the event of an incident, could we connect riders to share Uber and Lyft rides if feasible? For instance, when there are incidents on the San Bernardino Line, many of us go to the Riverside Line and Uber/Lyft up to the Pomona-North station from the Pomona-Downtown station.

OPERATIONS:

Mobile Ticket Vending Device (TVD) – relating to Fare Evasion, may be a mobile TVD system on the train (I believe trains in Poland has a full-blown TVD on the train). The mobile TVD could be just for conductor use against fare evaders or general public use. Pros and cons should be vetted as it could backfire and encourage fare evasion due to ease of accessibility (i.e. only buy ticket when caught).

Sensors – to detect water leaks, gas leaks or unusual equipment temperature similar to Smart Home devices, if any are applicable to trains. Maybe the temperature detection can be part of the equation when calculating restricted speeds due to hot weather.

Condition Based Maintenance Reporting. Wi-Fi would read a "self-report" from a part on the train (i.e. "Help Me, My Window Seal is Loose" through, likely, a sensor system which we would probably have to install separately. Apparently, Norway's NSB service, is doing this and saving big money.

Using Wi-Fi to communicate equipment status is possible. We are engaging our consultant LTK as a part of an existing project to determine the best means to communicate equipment health from the train to the necessary maintenance location. We plan to request funds for sensor technology to use along with a means of communication (e.g. Wi-Fi, cellular) to allow us to continually monitor the health of our rolling stock. Having Wi-Fi itself will not drive cost savings but will allow us to react to developing conditions and prevent unscheduled maintenance events. Our ultimate goal is to drive 90% availability of equipment which leads to the savings we all desire.

To enhance on the people counter module, we could ask the proposers to do a seat evaluation to incorporate into the mobile app as a way of checking how crowded a train/car is prior to boarding. This technology is being used in large parking structures to visually identify which levels are full in order to make it easier to find a spot.

Mechanical sounds – unsure how helpful this is but we could consider recording mechanical sounds during train ride. Something similar was created by MIT for cars to pinpoint problems, and while an app may not exist for trains perhaps a remote mechanic could better isolate the problem by listening to the recording right before the train broke down for quicker repair or assessment, the recording could also be used to proactively identify worn parts.

Digital signage – rotating signs in different languages, e.g. Quiet Car, Emergency Number

MARKETING:

We can create a Flash Page for the customers to market our campaigns as we know the train lines and the time of travel of customers. Currently, we do have social media campaigns which is broad. But in this case, we have the knowledge on exact train lines customers are traveling and this will help with customer retention. Also, this will result with marketing investment costs reduction significantly.

Optionally, we can ask customers to join with their email/phone # which will increase our email-marketing list. This will also give us insight into how frequently our customers visit each station/train. With this data, we can send promotional and informative emails specifically targeted to those customers at the most relevant times.

Hosting giveaway events during specified time frames, like a free roundtrip ticket to anywhere to someone connected to the Wi-Fi and posting something on social media at 6pm on specified lines (I presume IT or someone tech savvier than I would know how to identify if they are on a train and connected or not).

Can we push out the rideshare promo code through Wi-Fi?

ADVERTISING & PARTNERSHIPS:

We can find ways to offset cost of this free Wi-Fi by including advertising and brand partnerships. With added content, we can make Wi-Fi more attractive for users. Example - partnering with Amazon Prime, UBER, Lyft. Customer can shop with Amazon, book a car ride using Uber and this will give us a way to get fund for our Wi-Fi service and also enhance our customer experience on the train.

Just a thought, but maybe there is some potential to generate advertising revenue from the Wi-Fi service. Something like a quick 4-5 second advertisement right when the user logs on – similar to what YouTube does.

Something I've seen in London on the Heathrow Express and in Kuala Lumpur on the KLIA Airport Express trains - if we could incorporate a smart TV screen into each passenger car, then the Wi-Fi can be used by us for advertising and also display the status of both our services and connecting services (e.g. both for our services at Union Station and the status of Metro's services at Union Station). This would provide useful information to our passengers and generate some revenue from advertising, both without the need for additional cabling/hardware equipment in the train (apart from the smart TV screens).

Partner with a local news provider and provide news updates to riders.

Employee Ideas to Use Wi-Fi

One benefit of Wi-Fi would be that it helps us promote and directly monetize the “Work Hours on the Train” phenomena – beyond just ‘selling Wi-Fi access.’ This is the phenomena by which some passengers spend part of their official work hours working on the train, improving work-life balance. If we can really market this, we cease to be a company that just sells transportation and instead sells one of the most valuable and scarce resources – time. This benefits rider-employees, and it also benefits their employers. The rider benefit is straight forward: if train time counts as work time, then work takes up less of the day and more time is left for family, fun, sleep, etc. It also has significant benefits to employers. “Work Hours on the Train” combines some of the best elements of “remote working from home” (e.g. work/life balance) with the best elements of “in-office work” (e.g. in-person unscheduled interactions). It also allows an employer to greatly expand their prospective employee talent pool – for instance an employer in DTLA could reasonably attract employees from a three-hour commuting radius instead of a 1.5-hour radius. This, of course, benefits Metrolink by adding lucrative longer-distance trips. On-board customer Wi-Fi could help efforts to promote or monetize this phenomenon by: Making it easier for such employees to work on the train without mobile hotspots or air cards. They could access emails/etc. using Wi-Fi. It is easier for an employer to monitor/verify that employees are working on the train if they are online instead of not. This is particularly helpful for new employees who have not yet ‘earned’ their new employer’s trust. Metrolink could monetize this by offering premium Wi-Fi to such employees. For instance, a participating Corporate Partner (CPP) could pay a fee for their employees on the train to have premium or priority Wi-Fi access. Metrolink could potentially monetize this by offering a basic time-card capability as an upsell product to CPPs. For instance, if a participating employee scans their ticket on board the train to validate or logs on to the Wi-Fi, this could be timestamped and recorded, and the records be made available to the CPP employer for timekeeping purposes. Really succeeding at this would in turn, I think, open additional doors. For instance, by benefiting employers this phenomenon increases the value of physical workplaces connected to our system, which could open up partnerships with landlords or developers.

I connected ATT with Metrolink last year because Darrell challenged us on any future research and development. I was pulled from the project, so I was not able to see the project throughout. My original vision is to mirror what airports and their unique funding model where Metrolink will not be required to pay for the services and even see this opportunity as a revenue stream. Attached is a sample model I was working with the PARTNER and we can use the model with the future partner. Revenue Sharing. Let vendors on the right-of-way and tell them “Build whatever you want and keep up to 100% of your profit. In return, SCRRA keeps 100% of the revenues from Wi-Fi and pays $0 capital costs” or another version of this. Giving them access to the ROW for their purposes could be lots of money now that 5G is here. BART is doing this.

CUSTOMER EXPERIENCE:

Create a flash page for customer feedback while they are traveling on the train. This will help improve service for that particular line.

Targeted and Automated Announcements on Trains, Visual and Audio (i.e. "We are approaching

Covina Station, we are at Covina Station"). This would replace the conductor having to make the announcement. Capital Corridors tested this.

While Customers are waiting at the station, with a push notification we can talk about our train connections, what to eat at the station, talk about our on-time-performance of our trains, current discounts and promotions, how to connect free with Metro/ take any other transit.

Create a Metrolink Music streaming channel - announcements could be included here as well.

Also, some lessons learned from Singapore MRT and Hong Kong MTR – make connecting to Wi-Fi fast and effortless (i.e. no login/passwords or lengthy steps/agreement to Ts & Cs to logon). In Hong Kong and Singapore, needing another username/password and having to jump through steps to connect to the Wi-Fi was shown to be highly detrimental to users actually using the Wi-Fi. One way to make it fast/effortless is to enable the Wi-Fi connection via our app, which has the added benefit of being able to better control the internet content that our passengers can access. Also, the data collected from Wi-Fi users helped the transport planners visualize crowd and passenger flows through station platforms in real-time, and thus able to deliver better operational solutions for crowd control.

Clubs - can we use Wi-Fi to connect riders to each other with similar interests - Book Clubs, Make-Up Club, etc.

Seat availability – a way for riders to know what cars have seats available and where, can use same display to indicate which car is Quiet Car.

Could create a business car – more tables, printers available, etc. People can print through Wi-Fi.

LOYALTY:

Digital bulletin board – display upcoming events or ways to earn loyalty program points, possibly a channel for advertising revenue? Could also be used to introduce conductor of that train. While this could probably be incorporated into the loyalty program (whatever that looks like), I think it would behoove us to use this opportunity to capture some metrics and rider behavior/patterns to adjust/tailor future marketing/revenue streams/partnerships that riders might be interested in.

Use the same login for Wi-Fi as for the Loyalty Program.

Award points every time they use Wi-Fi.

This could be something as simple as "checking in" on the train and earning "points" for each ride that can be redeemed at a certain level for discounts or giveaways, being entered into raffles with one entry per ride, or even offering something to the person with the most rides/check-ins per month.

MARKET RESEARCH:

One thought I had about a possible benefit of Wi-Fi service is market research. From time to time we could have the browser open up to an online survey once the customer connects to the service. This could be a great opportunity to hear feedback from our customers on general services, or even a specific topic or event (like the Holiday Train).

Duplicate in Loyalty: While this could probably be incorporated into the loyalty program (whatever that looks like), I think it would behoove us to use this opportunity to capture some metrics and rider behavior/patterns to adjust/tailor future marketing/revenue streams/partnerships that riders might be interested in.

SUBMITTING AN UNSOLICITED PROPOSAL

I. Initial Review

An Unsolicited Proposal and Initial Review Form must be submitted to Metrolink's Contracts, Procurement, and Materials Management Division (CPMM). CPMM will log the proposal packet, assign it a number, and review the proposal to ensure that it is not:

- An offer responding to the Authority's previously published expression of need or request for proposals (this does not apply to Reverse Pitch Forums);
- An advance proposal that the Authority could acquire through competitive methods (submitted within the budget year before release of a published request for proposal); or
- A replacement for an existing contract that is already in effect; or
- An opportunity to stipulate the means and methods of an existing contractual relationship.

If the proposal meets the criteria noted above, within 3 business days CPMM will forward the proposal to the Office of the CEO who will then conduct an Initial Review. The Initial Review will determine whether the proposal contains enough information and detail to permit a Level 1 – Initial Evaluation. The Initial Review will occur within 30 days of receiving the proposal. The CEO's approval is required to advance to the next step.

INITIAL REVIEW FORM

Part 1. BASIC INFORMATION

Proposal Title: _____

Name of Company: _____

Point of Contact Name, Phone Number, and Email Address: _____

_____

_____

Business Address: _____

_____

Part 2. PROPOSAL SUMMARY

a. Describe the Metrolink business need that the proposal will address.

b. Describe the proposed solution.

c. What makes the solution innovative or unique?

d. How will the solution address current deficiencies or gaps?

e. How will the solution provide value to Metrolink?

f. What type of support is needed from Metrolink (facilities, equipment, materials staff)?

g. Describe the total cost to Metrolink.

h. Provide an estimated implementation timeline.

II. Level 1 - Initial Evaluation

If it is determined that the proposal contains enough information and detail to permit a Level 1 – Initial Evaluation, the Office of the CEO will organize a team of agency stakeholders and subject matter experts to evaluate the proposal. Metrolink shall consider the following factors, in addition to any other deemed appropriate for evaluating the proposal:

a. Direct or anticipated benefits to Metrolink, our riders, and the region

b. Unique, innovative, or meritorious methods, approaches, or ideas that have originated with the proposer

c. Overall merits of the proposed project

d. Capabilities related to experience, facilities, or techniques or unique combinations thereof that the proposer possesses and offers, and which are integral factors for achieving the objectives of the proposal

e. Financial benefit or cost to Metrolink, and level of capital contributions and risk assumption by the proposer

f. Timing considerations

The Office of the CEO will prepare a summary of the evaluation results, including a recommendation for further action. The possible outcomes may be:

- Advance to Level 2 - Request for Detailed Proposal
- Discontinue the process

It is anticipated that the Level 1 Evaluation will take no longer than 30 days to complete. The CEO's approval is required to advance to Level 2 – Request for Detailed Proposal.

III. Level 2 - Request for Detailed Proposal

With the CEO's approval, CPMM may issue a Request for Detailed Proposal. The Detailed Proposal must be in writing and sufficiently detailed for Metrolink to further determine the utility or benefit to the agency. At a minimum, the proposal must include:

- Title, abstract of the proposed effort, and the date of submission
- Proposer's name, address, and business description
- The objectives of the effort or activity, the method or approach, the extent of the effort to be employed, the nature and extent of the anticipated results, and how the proposal will support accomplishing Metrolink's mission
- Names of other parties who are participating in the proposal, including partners, joint-venture partners, subcontractors
- Brief description of the organization and previous experience in the field
- Names and biographical information of key personnel assigned to the proposed project
- Identification of proprietary data
- Proposed price or total estimated cost for the effort in enough detail for meaningful evaluation
- Period for which the proposal is valid (180 days is recommended)
- Proposed duration of the effort
- Name, phone number, and email address for technical or business personnel to be contacted for further information
- Statement, if applicable, concerning potential or actual organizational conflicts of interest

The Request for Detailed Proposal must be submitted to CPMM who will log the proposal and assign it a number. The Request for Detailed Proposal will then be transferred to the Office of the CEO. The Office of the CEO will assemble an evaluation team to review and evaluate the proposal. The evaluation team will include technical and financial subject matter experts related to the Detailed Proposal. Other factors that the evaluation team may consider are:

- Unique, innovative, or meritorious methods, approaches, or ideas that have originated with or assembled together by the offeror that are contained in the Proposal
- Direct or anticipated benefits to Metrolink, it's passengers, and the region

- Relevance to Metrolink's mission and values
- Overall scientific, technical, socioeconomic or other merits of the Unsolicited Proposal
- Proposer's capabilities, related experience, facilities, techniques, or unique combinations of these which are integral factors for achieving the unsolicited proposal's objectives
- Qualifications, capabilities, and experience of the proposed key personnel or team leader(s) who are critical in achieving the unsolicited proposal's objectives
- Financial benefit or cost to Metrolink, and level of capital contributions and risk assumption by the proposer
- Other factors appropriate for the proposal

Metrolink reserves the right to request supplemental information to include inviting the proposer to present their concept to the evaluation team, and answer questions of the evaluation team.

The Level 2 – Request for Detailed Proposal Review will take no longer than 60 days to complete. The CPMM Division will notify the proposer of Metrolink's decision and a general explanation of the reasons for the decision. The CEO's approval is required to advance recommendations related to implementation.

Metrolink may at any time choose not to proceed further with an unsolicited proposal.