HACC Dataset Informational Sheet

Hawaii Annual Code Challenge 2017

Department of Commerce and Consumer Affairs

Cable Television Division Proposal

Challenge Idea: HI Speed Map-It

Design a web-based application and a mobile application that will link to a speed test and record, map, and analyze the user's speed test data. The web-based and mobile applications should also allow users to report locations that have no access to Internet service.

Dates: Kick-off – Saturday, August 26, 2017 @ 9:00 a.m.
                        Judging and Awards – Saturday, September 23, 2017 @ 9:00 a.m.

Location: East-West Center, Imin Conference Center, Keoni Auditorium

Department: Department of Commerce and Consumer Affairs (DCCA)

Division: Cable Television, Broadband

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Why We Need HI Speed Map-It:

Access to the Internet is essential in today's world for jobs, education, commerce, entertainment, and community engagement. It can erase the distance to health care and education, drive economic growth, and improve our State's competitiveness.

As noted by Tom Wheeler, former Chairman of the Federal Communications Commission (FCC):

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High-speed Internet access has become fundamental to modern life, whether we are on the job, at home, or going to school. Broadband connectivity can overcome geographic isolation and put a world of information and economic opportunity at the fingertips of citizens in even the most remote communities.

A high percentage of residents in Hawaii's urban areas have access to high-speed Internet, but a gaping disparity exists for those who live in the rural areas of the State. To ensure that State policies and programs to expand broadband infrastructure deployment accurately target these unserved and underserved communities to close this "digital divide," reliable, granular, and publicly available data on Internet service availability across the State is needed. Such data would also allow the State to measure progress statewide in the availability of and access to higher broadband speeds over time.

Current sources of publicly available data for the State consist of provider reported data on subscriber numbers and availability, aggregated at the census-block level and based upon underlined advertised speeds rather than underlined actual speeds experienced by residents. This data does not paint an accurate picture of residents' real-world experiences, and is not sufficiently granular to identify the specific areas across the State that are unserved or underserved by the various technologies.

As part of DCCA's broadband-related duties to support and facilitate deployment of Internet access services throughout the State, DCCA would like to establish a means to collect data of actual speed tests taken by residents that may be used to inform government policies and programs aimed at advancing broadband access and speeds across the State, particularly to our unserved and underserved communities. DCCA would also like a consistent means to measure the increase in broadband availability and speeds in the State.

Background:

The FCC sets speed thresholds to define "broadband" Internet service for purposes of reporting to Congress on the availability and deployment of "advanced telecommunications capability" in the United States. In its 2016 Broadband Progress Report to Congress, the FCC listed its broadband benchmark speeds as actual download speeds of at least 25 Mbps and upload speeds of at least 3 Mbps (25 Mbps/3 Mbps).

The FCC currently uses deployment and subscription data collected through its Form 477 to assess the state of broadband availability across the nation. Providers file data with the FCC twice a year on where they offer Internet access services at speeds exceeding 200 kilobits per second (200 kbps). Wireline providers also file lists of census blocks in which they can or do offer service to at least one location, and other information, such as maximum advertised speeds. Mobile providers file maps of their coverage areas for each broadband technology they offer (e.g., EV-DO, HSPA, LTE). Some of the limitations of this wireline provider data are that it relies upon advertised speeds; is reported at the census-block level, which may encompass very large areas particularly in rural areas; and may overstate deployment because a census block may be reported as served if even a single location in that block is or could be served.

Under Chapter 440J, Hawaii Revised Statutes, DCCA also receives annual reports filed by providers that include broadband access availability aggregated at the census-block level. Providers must report the percentage of households, addresses, or tax map key parcels that cannot be serviced in a census-block

at the FCC broadband threshold speed. The limitation of this data is that it does not provide location information within the census blocks, and DCCA is required by statute to keep this data confidential.

To provide a more accurate picture on broadband access in the State, more granular data is needed that will allow identification of specific locations within a census block that have cable, DSL, fiber, cellular data service, home WiFi, public WiFi, or satellite, service and the actual speeds that may be achieved, and also specific locations that have no service or limited service available. DCCA would like to be able to collect and share this type of data, aggregated for individual privacy reasons, with the public, policy makers, and other stakeholders.

The Challenge:

1. To design a HI Speed Map-It prototype that includes incorporation of a speed test, to collect statewide wired and wireless (mobile) broadband coverage data from residents statewide that may:
   o Provide real-world data on statewide speeds and coverage areas that may be compared over time; and
   o Ensure that State policies and programs to expand broadband infrastructure deployment accurately target the unserved and underserved rural areas in the State in order to close the "digital divide" between our urban and rural communities.
2. To make the collected data available to the reporting consumer (User), policymakers, stakeholders, and the public in an easy to read format, including a map showing the results of speed tests taken, that provides an overall view of the available wireline and mobile speeds statewide in identifiable locations while protecting the privacy of the User.
3. To create a dashboard (strictly for DCCA Internal Use) to view data sorted, parsed or split by various categories, and over different time periods (e.g., a report of test results by island and ISP for a one-year and two-year period).
4. To use HI Speed Map-It to provide information and awareness of a variety of consumer-related broadband topics, such as the different ways in which broadband may be accessed (wired and wireless); broadband service available in various locations and the realized speeds in those locations; and the historical changes in the User's realized speeds reported through HI Speed Map-It.
5. To make HI Speed Map-It:
   o Easily accessible and enticing to the public, encouraging high public participation across the State in helping DCCA to collect as much data as possible; and
   o Easy and cost-efficient to maintain.

Design Criteria:

1. ***HI Speed Map-It Applications – Web-based and Mobile***
   a. **General Requirements**
      i. **Web-Based Application**
         1. **Hosting** – The web-based application would be hosted on the [DCCA Broadband website](#) or a separate DCCA hosted website.
      ii. **Mobile Application**
         1. **Application size –** The mobile application size should be as small as possible to minimize data usage for download.

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        2. **Cross Platform -** Must be designed for IOS and Android.

   iii. **Database** – The Applications must both be linked to and report data in one combined database. The database should be set up to allow DCCA to easily view and manage all reported data. See *3. Data Analysis* below.

   iv. **User Friendly** – To encourage Users to submit data, the Applications should minimize manual inputs of information. Geolocation, Auto-Fill, dropdown, and click-to-select responses should be used as much as possible.

        1. **Geolocation** – The web-based application will generally geolocate to a city-level location. The User can pinpoint his or her location on the map displayed either by inputting User's address or clicking on a map location. The mobile application will geolocate the User's specific location.

        2. **Auto-Fill –** Speed test results for the Applications should automatically be reported and inputted into a combined test database.

   v. **Links to DCCA Broadband Webpage** – Links should be provided to connect User to applicable broadband information on the DCCA broadband webpage.

   vi. **Visually Appealing** – The Applications should be visually inviting and easy to use to entice as many Users as possible to use the Applications repeatedly.

   vii. **Preventing False Inputs** – The Applications should include options to limit the ability of third parties to submit skewed or false results. For example, implementing a captcha, etc.

b. **Speed Test Software –** Developers shall assume that a third-party speed test on a neutral and dedicated hosted server will be used. The speed test server will be a Hawaii-based, off-net server. When either of the Applications are opened, the User will be asked to either conduct a speed test at his location (see Geolocation above), or report "No Internet Service Available" at a location the User specifies using the map. If User chooses to take the speed test, User can either 1) enter the location as an address, which will appear as a marker on the map, or 2) click on the map to select the location, which will appear as a marker on the map. Once a location is selected, user will have the option to begin the speed test, as well as fill in connection type and other information.

   i. **Speed Test Results** – See attached Data Flow Diagram and Sample Data Documents for details.

   ii. **Other Information Collected –** The Applications should automatically or, if automatic collection is not possible, through a dropdown menu, collect information from each User. See attached Data Flow Diagram and Sample Data Documents for details.

c. **No Internet Service Available Reporting** - For User to "Report No Internet Service Available", the User can either 1) enter the location as an address, which will then appear as a marker on the map, or 2) click on the map to select the location, which will appear as a marker on the map. The User can then select the types of service that are <u>not</u> available at that location, and provide other comments in a comments box (e.g., more details on the location; [provider name] offers service in area, but no available circuits for new subscribers; neighbor across the street has service but I don't; etc.).

      i. **Information Collected -** See attached Data Flow Diagram and Sample Data Documents for details.

2. Mapping

    a. Esri - The State of Hawaii presently has an Enterprise License Agreement with Esri. Therefore, the applications should be compatible with the State's GIS Platform (Esri ArcGIS and ArcGIS Online). Additionally, the State's authoritative GIS data should be used wherever possible (via REST Services).

    b. Internal vs. Public-Facing Maps

        i. Internal Maps for DCCA Use – DCCA would like all data reported via the application to automatically appear on a confidential, internal map accessible only by DCCA. Data points on the internal map would show all data collected, including specific address/location for each test reported.

        ii. Maps Available to the Public– To protect the User's privacy, the data on the publicly viewable maps generated by the Applications should be restricted as follows:

            1. User Data – Each User will have access to data collected for the User's most recent speed test (result will appear on the Applications' map).

            2. Aggregate Data – All Users will be able to see, in a separate map on the DCCA Broadband Website or a separate DCCA hosted website, speed test results of all Users, aggregated at the census block level. For example, a User may click on a specific census block to see the number of speed tests taken, the mean speed of all tests taken, the highest and lowest speed reported, and the total number of "No Internet Service" locations.

                a. Data Period Shown on Maps - Aggregate Data Map should continuously update to reflect speed test data reported from the Applications for the past 365 days.

                b. FCC Overlay – To provide more information to the public on broadband availability in User's area, DCCA would like the latest FCC Form 477 Data to be a feature class overlaid over the map containing all User's aggregated application results. *See https://www.fcc.gov/maps/fixed-broadband-deployment-data/*. This will allow Users to see the various providers' data reported to the FCC for Users' respective locations.

                    i. Automatic Update – Form 477 Data is updated twice a year. If possible, the application should auto-update this information when it is updated on the FCC site. The FCC posts state-level datasets here: https://www.fcc.gov/general/broadband-deployment-data-fcc-form-477. If this is not possible, DCCA would like the program to be able to automatically map the provided FCC data upon upload of a state-level dataset.

    ii. **User Friendly** – DCCA would like the Form 477 Data overlay to be easily interpretable, similar to the FCC map, available through the link provided above.

 3. *Data Analysis*
  a. **Single Database –** Data from the Applications will be collected in a single database for purposes of data analysis.
  b. **Dashboard (strictly for DCCA Internal Use)** – For ease of use, DCCA would like a single dashboard to view data sorted, parsed or split by a variety of categories, and over different set time periods (e.g., a report of test results by island and ISP for a one-year and two-year period).
   i. **Raw Data** – Along with aggregate data, DCCA would also like the option to download complete raw data sets over periods of time in various common formats (excel, csv, etc.).
   ii. **Charts and Maps –** DCCA would also like the ability to visually display parsed or split data in application generated charts and maps.
   iii. **Ease of Use –** Dashboard should be usable by persons without extensive experience with excel or GIS mapping applications.
  c. **Flagging and Filtering False Results** – To protect the validity of collected data, it would be desirable to have a methodology in place that will flag questionable speed test and "No Internet Service available" results that may need to be reviewed for possible removal from the database.

Potential Tools Needed:

1. **Software –** Esri ArcGIS Software, Third-Party Speed Test Software, third-party speed test server located in State of Hawaii.
2. **Data Set –** FCC Form 477 Data and Statewide GIS Census Block layer (via REST service).

Attachments:

HACC2017_DCCA sampledata_0816_2017.xlsx

HACC2017 DCCA DataFlowDiagram_0816_2017.pdf