

City WiFi System (Public and Authenticated Networks)

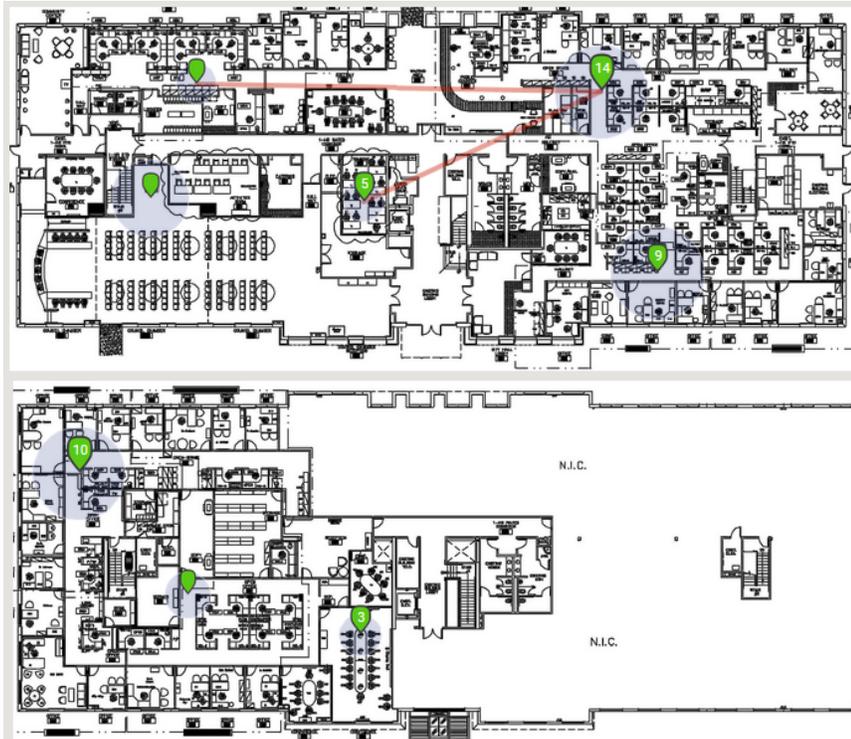
1. Summary

The City of Lake Forest WiFi system is based on Meraki access points and cloud management software. The systems were installed during Fiscal Year 2014-15. Key features of the system are separate public and private WiFi SSIDs, public WiFi access throttling to 1 Gbps per user, website filtering based on content and threats, seamless access across each facility, and high performance.

2. Systems

Each of the network below is integrated into the Meraki dashboard. Images below show the Access Point maps or floorplans, AP list, and network topology.

a. Lake Forest City Hall & Civic Center



Access points for the last day ▾

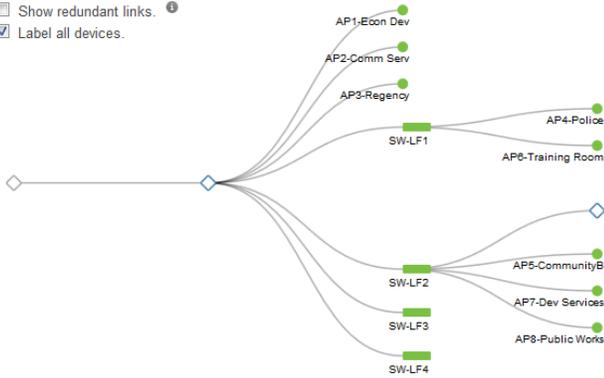
Tag ▾ Move ▾ Search access points... ▾ 8 access points

<input type="checkbox"/>	Status	Name ▲	Alerts	Tags	Contact
<input type="checkbox"/>		AP1-Econ Dev			now
<input type="checkbox"/>		AP2-Comm Serv			now
<input type="checkbox"/>		AP3-Regency			now
<input type="checkbox"/>		AP4-Police			now
<input type="checkbox"/>		AP5-CommunityB			now
<input type="checkbox"/>		AP6-Training Room			now
<input type="checkbox"/>		AP7-Dev Services			now
<input type="checkbox"/>		AP8-Public Works			now

Network Topology BETA

Search devices... ▾ 12 online

- Show redundant links. ⓘ
- Label all devices.



b. Lake Forest Sports Park & Recreation Center



Access points for the last day ▾

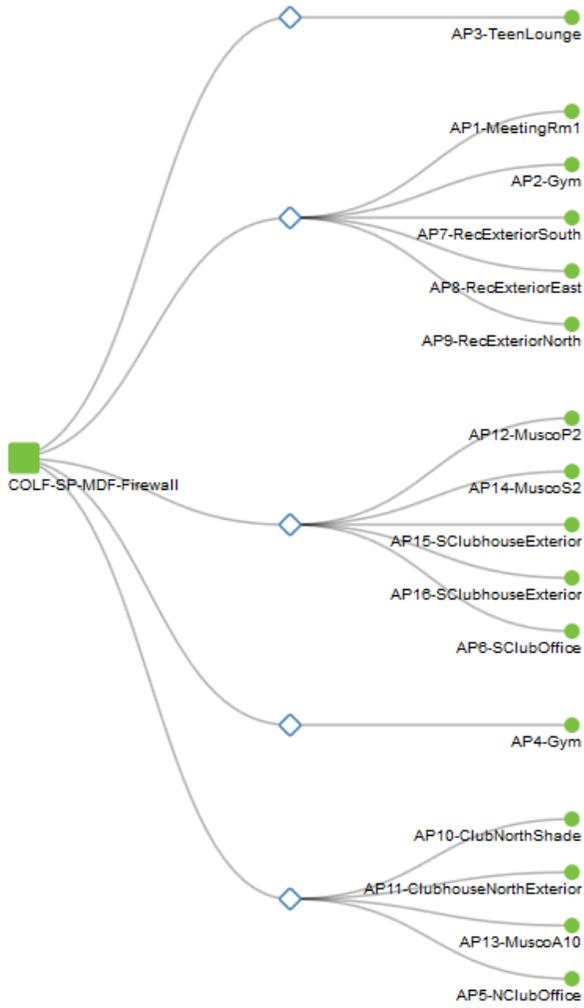
Tag ▾ Move ▾ Search access points... ▾ **16 access points**

<input type="checkbox"/>	Status	Name ▲	Alerts	Tags
<input type="checkbox"/>		AP1-MeetingRm1		APs Interior Rec Sports
<input type="checkbox"/>		AP2-Gym		APs Interior Rec Sports
<input type="checkbox"/>		AP3-TeenLounge		APs Interior Rec sports
<input type="checkbox"/>		AP4-Gym		APs Rec interior sports
<input type="checkbox"/>		AP5-NClubOffice		APs clubhouse interior sports
<input type="checkbox"/>		AP6-SClubOffice		APs clubhouse interior sports
<input type="checkbox"/>		AP7-RecExteriorSouth		APs exterior rec sports
<input type="checkbox"/>		AP8-RecExteriorEast		APs exterior rec sports
<input type="checkbox"/>		AP9-RecExteriorNorth		APs exterior rec sports
<input type="checkbox"/>		AP10-ClubNorthShade		APs clubhouse exterior sports
<input type="checkbox"/>		AP11-ClubhouseNorthExterior		APs Clubhouse Exterior Sports
<input type="checkbox"/>		AP12-MuscoP2		APs Exterior Pole Sports
<input type="checkbox"/>		AP13-MuscoA10		APs exterior pole sports
<input type="checkbox"/>		AP14-MuscoS2		APs exterior pole sports
<input type="checkbox"/>		AP15-SClubhouseExterior		APs clubhouse exterior sports
<input type="checkbox"/>		AP16-SClubhouseExterior		APs clubhouse exterior sports

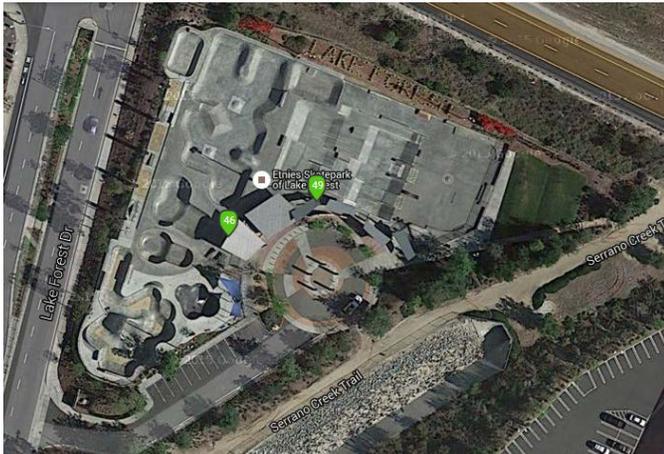
Network Topology BETA

Search devices... ■ 17 online

Label all devices.



c. Etnies Skate Park of Lake Forest



Access points for the last day ▾

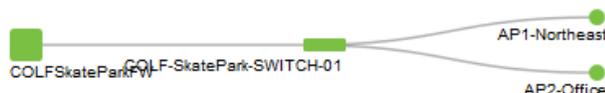
Tag ▾ Move ▾ Search access points... ▾ 2 access points

<input type="checkbox"/>	Status	Name ▲	Alerts	Tags
<input type="checkbox"/>		AP1-Northeast		
<input type="checkbox"/>		AP2-Office		

Network Topology BETA

Search devices... ▾ ■ 4 online

Label all devices.



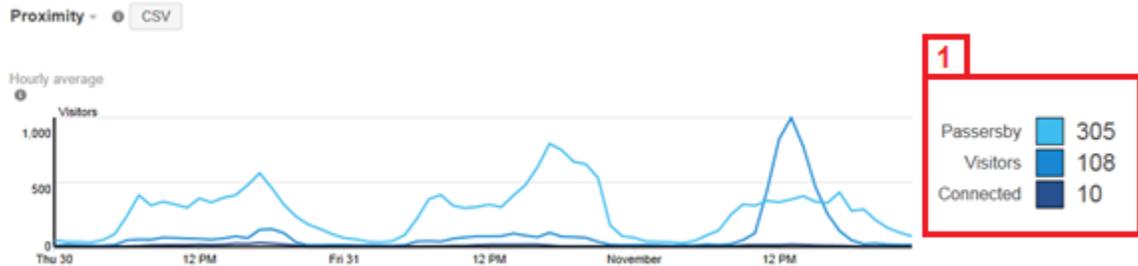
3. Analytics

Using the the Meraki wireless (WiFi) system deployed at the Sports Park as an example, it includes a web-based analytics GUI (Graphical User Interface) that enables the real-time or historical (up to 12 months) visualization of usage data. This summary provides a brief look and explanation of three types of data Meraki provides: Location Analytics, the Heatmap, and Access Point status.

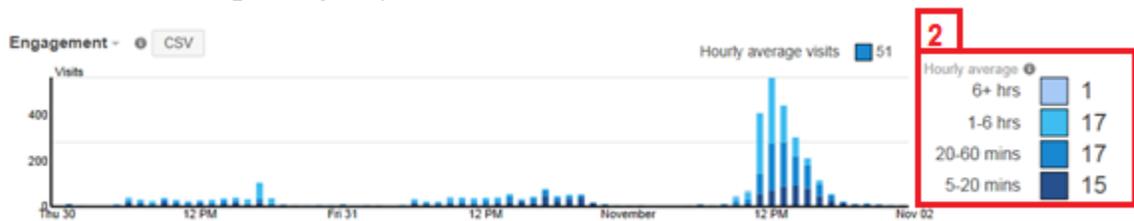
The Location Analytics view displays various system usage statistics. The screen capture below displays WiFi usage from 10/30/14 to 11/01/14, capturing system usage during the Sports Park’s Opening Ceremony on Thursday evening and the Grand Opening event on Saturday. The three charts are titled Proximity, Engagement, and Loyalty. It is worth noting that there are significant limitations to these statistics. A person could have multiple WiFi capable devices, which show up as multiple records; conversely a park visitor without a WiFi device, or with device in which WiFi is disabled, will not be reflected in these statistics.

#1 Proximity: Meraki groups users into 3 categories. The numbers show a daily average of each group.

- “Passersby” are devices with WiFi capability that are detected by the Access Points (APs) for less than 5 minutes duration. Typically this might be in a vehicle or bicycle passing by the park.
- “Visitors” are those who are connected for more than 5 minutes sequentially, but do not login to the WiFi system and connect.
- “Connected” devices are the subset of “Visitors” that have accepted the user policy, and logged into the Guest WiFi network at the Sports Park. In the example below.



#2 Engagement: Displays the time duration that the “Visitors” were at the park and detected by the Meraki APs. The number is displayed as an hourly average of 51 visits per hour. The large spike in Engagement is seen on the Park’s Grand Opening day, November 1.

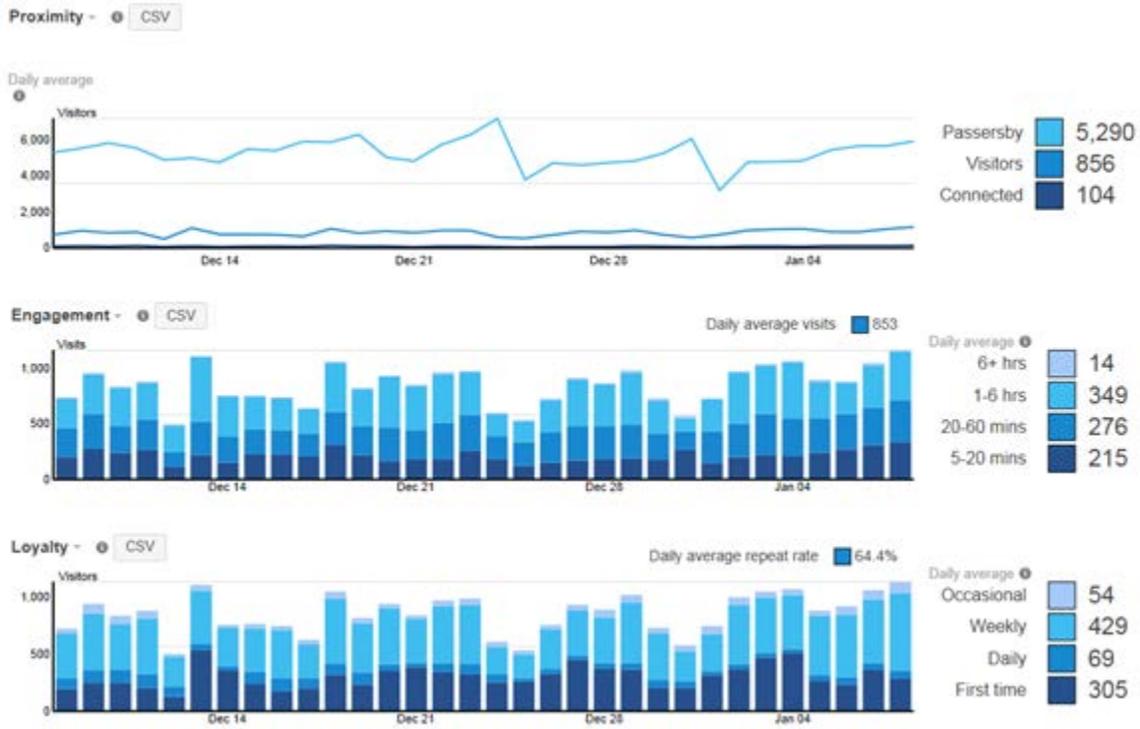


#3 Loyalty: Meraki tracks usage on a per-device basis and remembers previous instances of any given device. These numbers are also displayed as an hourly average of “Visitors” to the park. In the example below, the park averaged 61.4 repeat visitors per hour broken into Occasional, Weekly, and Daily visitors.



The figure below shows the Proximity charts with a date range of December 8, 2014 to January 8, 2015. Usage has reached a more consistent level, with park “Visitors” averaging 853 per day. There are clear “dips” in attendance (of WiFi

enabled devices!) on December 25 and the second dip possibly reflects the rain and cold weather that moved in late January.



4. Heatmap

The “Heatmap” view in Meraki shows approximate distribution and movement of people/devices within the park over time. The large green balloons show locations of the Access Points (APs). The small dots indicate identified device locations at a selected time: gray for “visitors” and blue for “connected.” The color shaded areas indicate both movement and bandwidth usage. Bandwidth usage increases as it shades green/yellow/orange/red. In the interactive display each AP and dot can be highlighted to display pertinent information about it.



5. Access Points

The “Access Points” table provides a list of the installed Access Points (APs) by device name, search tags, Usage, Connectivity and number of clients accessing that AP, for a specific time duration. All Access points show excellent connectivity and usage varies from none to over 14 Gigabytes, while number of clients range from 0 to 57.

Access points for the last day ▾

Tag ▾ Move ▾ 16 access points Add APs Download as ▾

<input type="checkbox"/>	Status	Name ▲	Alerts	Tags	Contacted at	Usage	Clients	Connectivity	Mesh speed +
<input type="checkbox"/>		AP1-MeetingRm1		APs Interior Rec Sports	now	627.2 MB	31		(gateway)
<input type="checkbox"/>		AP2-Gym		APs Interior Rec Sports	now	132.2 MB	22		(gateway)
<input type="checkbox"/>		AP3-TeenLounge		APs Interior Rec sports	now	155.0 MB	36		(gateway)
<input type="checkbox"/>		AP4-Gym		APs Rec interior sports	now	14.46 GB	53		(gateway)
<input type="checkbox"/>		AP5-IClubOffice		APs clubhouse interior sports	now	None	0		(gateway)
<input type="checkbox"/>		AP6-SClubOffice		APs clubhouse interior sports	now	140 KB	3		(gateway)
<input type="checkbox"/>		AP7-RecExteriorSouth		APs exterior rec sports	now	719.1 MB	54		(gateway)
<input type="checkbox"/>		AP8-RecExteriorEast		APs exterior rec sports	now	324.4 MB	22		(gateway)
<input type="checkbox"/>		AP9-RecExteriorNorth		APs exterior rec sports	now	111.2 MB	27		(gateway)
<input type="checkbox"/>		AP10-ClubNorthShade		aps clubhouse exterior sports	now	31.7 MB	12		(gateway)
<input type="checkbox"/>		AP11-ClubhouseNorthExterior		APs Clubhouse Exterior Sports	now	19.4 MB	4		(gateway)
<input type="checkbox"/>		AP12-MuscoP2		APs Exterior Pole Sports	now	523.5 MB	46		(gateway)
<input type="checkbox"/>		AP13-MuscoA10		APs exterior pole sports	now	28.7 MB	10		(gateway)
<input type="checkbox"/>		AP14-MuscoS2		APs exterior pole sports	now	635.5 MB	57		(gateway)
<input type="checkbox"/>		AP15-SClubhouseExterior		APs clubhouse exterior sports	now	33.4 MB	40		(gateway)
<input type="checkbox"/>		AP16-SClubhouseExterior		APs clubhouse exterior sports	now	76.1 MB	25		(gateway)

Conclusion

Meraki WiFi System provides powerful tools for monitoring and managing the system, as well as analytic tools useful for research into attendance patterns and facility usage. The flexibility of the system allows new access points to be seamlessly added as needed on an ad-hoc basis. Entire new facilities can be added to the network with ease.