Testing ahead of a deployment

Overview

Deploying an entire solution using Wiliot technology can be a complex task with several parts. Testing individual parts of the solution independently can reduce the complexity and isolate potential issues before attempting to achieve a working end-to-end solution. This guide includes simple tests that can, and should be performed ahead of a full deployment.
Ideally, some of these tests should be done during a site survey.

Testing the RF Environment

Wiliot IoT pixels use RF to power themselves and to broadcast their information. RF environments vary widely so it's important to ensure that the RF environment is suitable for the operation of Wiliot pixels as well as bridges and gateways. Elements that may have an effect are:

- Physical obstacles - some materials such as metals are excellent RF blockers and can impede pixel energizing and reception of packets from them
- Tagged material - As mentioned in IoT Pixel - Materials & Blockers not all materials are suitable for direct application of Wiliot pixels
- Interference - Deployment sites are often rich with other forms of radio communication or other signals which may interfere with the operation of Wiliot pixels

Testing the RF environment and eliminating possible interference can be done with a simple test:

1. Apply a pixel with a known ID to a piece of cardboard (making sure to use a pixel optimized for cardboard), preferably 8mm thick
2. Place an appropriate bridge in an intended installation location - for testing purposes, this bridge can be powered with a portable USB power bank (note that some USB power banks are designed to shut down after a while with low power consumption - use one that supports trickle charge).
3. Move the pixel around keeping a rough distance from the bridge equivalent to the distance to be used in the actual deployment
4. Use a Wiliot mobile app to make sure packets are being received from the pixel at gradually increasing distances
    1. If packets are being received by the mobile app at the intended distance from the bridge it's safe to assume that the RF environment is suitable for deployment
    2. If packets are not being received by the mobile app - this indicates a potentially problematic RF environment that should be explored further. Contact support@wiliot.com or create a ticket with as much information as possible for assistance

Testing Material Suitability

Assuming a successful test of the RF environment, the next step is to test how the Wiliot pixel performs when attached to the actual material it is intended to be used on. Repeat the test above using one or more pixels attached to the intended item directly. If the mobile app does not receive packets from the pixel(s) or the range is significantly degraded, this indicates that the material the item is made of is likely affecting the signal. Consider using cardboard spacers in between the pixel and the item to work around this issue.

Testing Gateway to Cloud Connectivity

A gateway is required, as part of Wiliot's three-tier architecture , to upload pixel packets to the cloud. Once gateways have been installed, powered up, provisioned and registered they should appear online in the management portal

In addition, the cloud generates an NTWK event with a value of 1 when a gateway connects successfully so this can also be used as an indication of good gateway connectivity.

If the gateway cannot connect to the Wiliot cloud, check that the network the gateway is connected to allows access to the required URLs and ports

Testing Bridge to Gateway Connectivity

Bridges play an important role in Wiliot's three-tier architecture . They should be placed within 60-100m from a gateway to be able to communicate with it. To make sure all installed bridges are "seen" and managed by a gateway, see the management portal or the Management API (using PyWiliot) to make sure all bridges are connected to a gateway and that they are online.

Testing Bridge Optimal Installation

Once basic functionality has been confirmed, the next step is to test that bridges are installed in an optimal way in terms of position and orientation. Read this guide for information about the optimal orientation of pixels and bridges.

1. Install bridges based on the information in the guide above
2. Place tagged items at a distance and orientation representative of the real use-case
3. Set pacer interval for the bridges being tested to 60 (1 minute)
4. Collect DBUG events for 15 minutes (make sure that your cloud 2 cloud application is not filtering these events out and that DBUG events are enabled for the account)
5. Add up the values from all DBUG events per pixel
6. Vary bridge placement and orientation and repeat the steps above. Compare the aggregate value sums for each pixel. The higher the number, the more packets are received from the pixel, which usually indicates a more optimal placement/orientation

Make sure to return the pacer interval to the desired value for the use case to reduce cloud costs and disable the DBUG event when the experiment is concluded.

Useful Tools

1. A good visualization tool is crucial when optimizing a deployment. Check out our DBUG deployment Grafana dashboard for some good insights.