

Prompt:

See attached for a .PCAPNG file from MetaGeek App captured using an Oscium Nomad packet analyzer and an Oscium Wi-Spy spectrum analyzer. This capture is taken while walking through a dense warehouse facility and roaming between multiple APs in different rows/aisles of the warehouse. The main client we want to focus on is an iPad which has the MAC address of: 32:82:13:87:a4:ce. The iPad in this capture is performing a simple ICMP ping test to a few endpoints but the actual workload is an HTTPS ERP warehouse application and we want to ensure we have the best performance possible for our end users. Can you review the capture and determine if anything sticks out as either a current issue that would affect performance in a real-world way or if you notice anything that can be improved realistically? Be sure to look at roaming to see if the roaming is as seamless as expected, also review signal levels (we are aware there are a few spots in the warehouse that need APs added to improve RF strength), also review other potential clients' behavior on this network to see if anything seems amiss, also review broadcast, multicast, etc to see if that could be an issue. We are primarily concerned only about the 5GHz band and especially the GFRenolds-RF1 SSID. We already know that we have a lot of Ring cameras on the 2.4GHz band so we aren't as concerned about performance on that band as our production devices are only on the 5GHz band. All of our APs are UniFi U6 LR and we have turned the radio power down to 22 dBm transmit / 27 dBm EIRP. We have also optimized each SSID so that 802.11r is enabled, 2.4GHz minimum data rate is 9Mbps and 5GHz minimum data rate is 12Mbps, Multicast to Unicast is enabled, Multicast Filtering is set to Auto, Proxy ARP is on, BSS Transition is on, and UAPSD is on. One thing to note: the capture labeled "iPad production" is not a warehouse environment but instead two sections of the same building but in this case there is just one AP in each section so we are less concerned about roaming in this area and the capture may look different as the client will not roam as much in this area. Also, in this area we have the AP power turned up to "High" as there is no secondary AP available in most of this area.

Response:

Thought for 22m 12s

I reviewed all three captures.

The target iPad MAC 32:82:13:87:a4:ce is present in all of them, so these do **not** look anonymized.

Bottom line

The **production** capture looks clearly better than the two warehouse captures.

For the warehouse captures, the main issue is **RF coverage / edge-of-cell behavior**, not an obvious broken roaming feature or a multicast/broadcast problem. Roaming is happening, and I do see transition-related action traffic consistent with assisted roaming, but the iPad is spending enough time in weaker coverage that retries climb to a level that can absolutely show up as “ERP feels laggy” in real use.

Big findings

1) The iPad stayed on 5 GHz

I did not see the target client falling onto 2.4 GHz. That is good and matches your design intent.

2) Warehouse captures have moderate retry rates

For the target iPad on **GHFreyolds-RF1 / 5 GHz**:

- **oldwarehouse**
 - uplink retry: **10.3%**
 - downlink retry: **16.4%**
- **phase 2**
 - uplink retry: **10.8%**
 - downlink retry: **12.7%**
- **production**
 - uplink retry: **7.1%**
 - downlink retry: **6.7%**

That is the biggest practical difference I found. Production is materially cleaner. The warehouse captures are not catastrophic, but they are high enough that users can feel intermittent sluggishness in a web ERP app.

3) The warehouse has noticeably more weak-signal airtime than production

Using the monitor-radio RSSI as an over-the-air indicator:

- **oldwarehouse AP->client observed signal**
 - median about **-63 dBm**
 - about **22%** of AP-originated frames were below **-70 dBm**

- about **11%** were below **-75 dBm**
- **phase 2 AP->client observed signal**
 - median about **-65 dBm**
 - about **23%** below **-70 dBm**
- **production AP->client observed signal**
 - median about **-58 dBm**
 - only about **2.2%** below **-70 dBm**

That lines up with your note that some warehouse areas still need AP help. In plain English: the warehouse captures show the client spending meaningfully more time near the edge of workable coverage.

4) Roaming does not look fundamentally broken

I do see the iPad moving across multiple 5 GHz BSSIDs in the warehouse captures, and I see a lot of action-frame activity around transitions. I do **not** see the classic signature of a totally broken roam design such as constant full reconnect loops, repeated authentication storms, or obvious ping-ponging every few seconds between the same two APs for long stretches.

What I **do** see is this pattern:

- the client operates normally on one AP
- signal quality degrades / retries increase
- the client transitions to another AP
- some short pauses and brief exploratory frames happen around the handoff

That points more toward **coverage / overlap tuning** than a protocol feature problem.

5) Broadcast / multicast is present but not the main problem

On 5 GHz GHFreynolds-RF1 data traffic, group-addressed data was roughly:

- **oldwarehouse: 4.4%**
- **phase 2: 6.4%**
- **production: 7.5%**

That is not nothing, but it is not the smoking gun here. With multicast-to-unicast, proxy ARP, and your other settings, broadcast/multicast does not look like the main airtime killer.

6) There is one other very busy client, but it does not look obviously broken

A station d0:65:78:74:bb:98 was the busiest non-AP transmitter I saw in all three captures. Its retry rate was not extreme in oldwarehouse and phase 2, and only moderate in production. So it is worth knowing about, but I would not call it the root cause from this data alone.

Per-capture read

ipad oldwarehouse

This is the roughest of the three from a user-experience standpoint.

The iPad roams across many 5 GHz APs, which is expected in that warehouse walk. The bigger concern is that downlink quality is inconsistent enough that retries are elevated before or around the roams. That is where I would expect users to feel pauses or sluggish page/app response.

ipad phase 2

Still warehouse-like, but a bit more orderly. The client spends longer on a few dominant APs, and the roam behavior still looks basically sane. Retry rates are still higher than I would want for “best possible” handheld/ERP performance.

ipad production

This one looks good.

The iPad is mostly anchored to one AP for the bulk of the capture, with much cleaner retry behavior and much better observed signal. Given your note that this area has fewer AP choices and higher power, the capture outcome actually looks reasonable.

What I would change first

- 1. Fix weak warehouse pockets before changing roaming features.**

The captures do not suggest that 802.11r, BSS Transition, U-APSD, proxy ARP, or multicast-to-unicast are the primary issue.

- 2. Prioritize AP placement / coverage overlap in the aisles where users complain.**

For warehouse handheld/iPad use, I would want the primary serving cell to stay comfortably stronger than the marginal areas I’m seeing here.

3. **Use the warehouse captures to map weak zones physically.**

The biggest win is likely identifying where the iPad is entering those weaker cells and either:

- adding an AP,
- adjusting AP placement,
- or slightly rebalancing cell overlap.

4. **Do not treat production as a problem area right now.**

Based on this capture, production looks materially healthier. The higher power there does not appear to be hurting this client in an obvious way.

My practical conclusion

Your current advanced settings are mostly fine. The warehouse issue looks much more like **RF design / coverage refinement** than a bad roaming configuration.

If this were my site, I would spend my next effort on:

- locating the exact warehouse aisles where coverage drops off,
- improving overlap there,
- and then re-testing the same iPad walk.

That is more likely to improve the ERP experience than changing 11r, U-APSD, or multicast settings.

If you want, I can turn this into a tighter AP-by-AP roam timeline with the main BSSIDs and likely handoff points for each file.