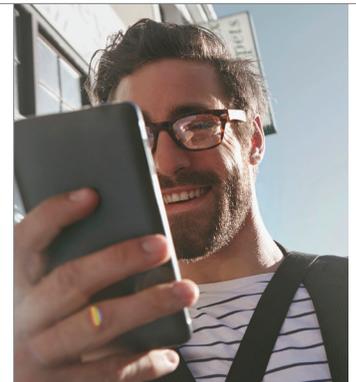
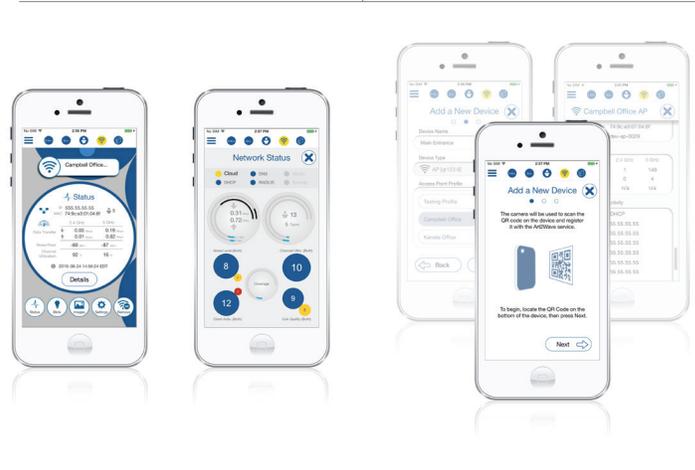


Addressing high density Wi-Fi network requirements with Proactive, Machine Intelligent Cloud Service Wi-Fi

High density environments are typically those, where the number of client devices and applications routinely exceed the available capacity of a Wi-Fi network. This is especially true if the network was intended to provide maximum coverage, which does not necessarily offer the best throughput/user. As Wi-Fi uses a shared, unlicensed spectrum, clients and AP's compete for the best available airtime to transmit and receive data. Poor choice of frequencies or channels, inadequate consideration of link quality, frequency reuse, application or physical characteristics - can all lead to degradation of the available throughput.

While traditional Wi-Fi vendors will offer design principles or tips to optimize throughput under highly variable conditions, the scope involved in actually implementing those tips is usually beyond that of a typical IT professional. Fine tuning knobs that improve RF performance requires 24x7 monitoring of the environment, with the ability to adapt configurations to changing device and application usage. Configurations that ensure best throughput during off peak times, may fail to meet the demands during peak windows. Below are some common examples where KodaCloud's solution completely eliminates the need for IT to have to understand, implement, monitor and adjust RF parameters in a high density Wi-Fi network.

1. **Wi-Fi networks designed for coverage, don't guarantee capacity.** To optimize for capacity, you would have to first understand concepts such as co-channel interference, band steering, spectral capacity, collocated APs and load balancing. Mastering these generally require expert certifications such as CWNP or CCIE-W, in addition to 100's of hours of real world experience.
 - We make it easy for you. Our learning and automatic algorithms take care of all these once your Wi-Fi network is deployed. It doesn't matter if it was originally designed for maximum coverage. Our system learns from the changing use pattern, and adapts your network for the right balance between coverage and capacity.
2. **Vendors will frequently require IT to identify client device capabilities.** In an environment, where users bring their own devices and expect them to work seamlessly with the Wi-Fi infrastructure, this would be a major work effort. First you'd have to know what devices are currently being used and if they are 802.11 a/b/g/n radio capable. Second, you'd have to understand the impact of data



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rates, frequency bands and modulation techniques to throughput optimization per client device. Finally, you'd have to run a spectral analysis to determine transmit and receive data rates based on spatial streaming supported. Such expertise again, is either expensive to staff in-house or acquire from outside IT consulting firms. Companies spend upwards of \$5-10K simply running RF tests, in what is typically a static environment and that too, only when users complain of poor download/upload speeds leading to immense frustration and loss of business.

- We do not believe IT should have to do this. Usage patterns change constantly, and RF parameters must dynamically adapt to those changes. Without a 24x7 proactive monitoring and Machine Learning system that can crunch large quantities of RF parameters collected over time, IT will find itself unable to adequately respond to user complaints. The KodaCloud system automatically monitors critical RF and network parameters, and either adjusts those parameters or make proactive recommendations to IT.
3. *Vendors may ask you to determine & configure a “target” application throughput per device type.* Or they may ask you to “future proof” your AP and channel capacity. They may also require you to frequently switch between 2.4Ghz and 5Ghz frequencies, or adjust the channel width from 40Mhz to 20Mhz to maximize use of spectral capacity. In our view, most of these manual adjustments are an exercise in futility. Applications are by nature bandwidth hungry, and newer applications demand that the network be agile and responsive. BYOD only makes this worse. In the case of entertainment or video conferencing, high definition audio & video can quickly make such initial configurations irrelevant. These estimates may work for initial planning and or when you have a trickle of users, running low bandwidth applications.
 - After the initial deployment, the KodaCloud system monitors the usage and types of applications and makes the necessary adjustments/recommendations. For example, smaller bandwidths are better suited for high density and our system will adjust parameters to implement this dynamically. Therefore, you as IT, don't have to worry about which devices, are running what applications, and what their preset configurations allowed them.
 4. *Vendors will ask you to optimize Signal-to-Noise (SNR) ratio within a specific coverage area or have you measure co-channel interference using off the shelf tools.* Radio is a scarce resource, and in the Wi-Fi heavy world we live in, devices will aggressively compete for that resource putting your network (and you) in a lot of stress. However, interpretation of the data, analysis, aligning with “benchmarks” and implementation of configuration changes requires a combination of RF expertise, complicated spectral analysis tools and understanding of troubleshooting guides.
 - Our built in radio resource management features, together with the self learning system and in-house RF experts, can analyze and proactively implement performance enhancing configuration changes - without having you spend valuable time on such optimization activities.

For more details on how KodaCloud can help you design a highly responsive Wi-Fi network that adapts to changing high density usage, please talk to our System Engineers at sales@KodaCloud.com.