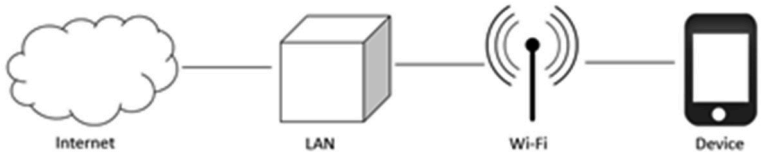
Establishing and Maintaining an Internet Connection

All cellular devices can have a difficult time maintaining a consistent internet connection because of the many different configurations, restrictions, and limitations that can be placed on internet access points. Because of the inconsistent internet connections that most devices have, some devices may fail to receive some Spok Mobile messages.

Wi-Fi Internet Connections

In addition to the internet coverage that is provided to devices through the device's cellular provider (ATT, Verizon, Sprint, etc.), devices also have the ability to connect to the internet through public and private Wi-Fi connections.
Many Wi-Fi configurations are set up like below:

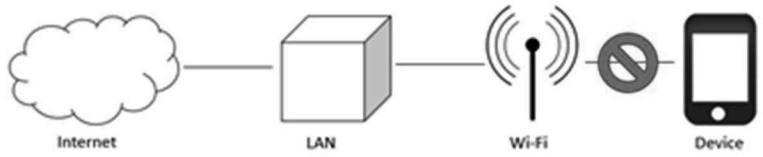


In this case, before the device can successfully connect to the internet, the device must first establish a successful connection to the Wi-Fi, then to the configuration's local area network (LAN or router), and then to the configuration's internet. If the device fails to establish a connection to any piece of the configuration, the device cannot successfully connect to the internet. This can prevent devices from receiving Spok Mobile messages.

Wi-Fi Access Limitations

In some cases, cellular devices have the ability to access Wi-Fi connections. However, devices can be prevented from successfully connecting to an available Wi-Fi network, which then also prevents the device from successfully connecting to the configuration's local area network (LAN or router) and internet connection. Some causes of a Wi Fi connection preventing devices from connecting can include the following:

- Wi-Fi is private
- Wi-Fi's allotted number ofIP addresses is already used and additional IP addresses are unavailable or cannot be distributed

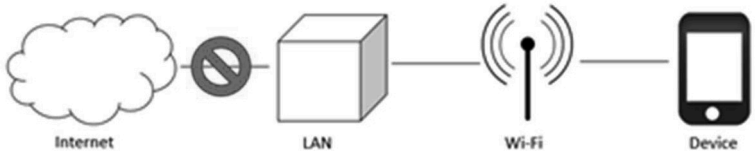


For example, Dr. Miller leaves ABC Hospital where he had a successful Wi-Fi and internet connection and he travels to ABC Clinic where there is also Wi-Fi and internet available. However, ABC Clinic's Wi-Fi is configured as a private Wi-Fi network. Because Dr. Miller has never established a successful connection with ABC Clinic's Wi-Fi or internet, Dr. Miller cannot access the network until he logs in, as required by the Wi-Fi configuration. In this case, Dr. Miller could miss Spok Mobile messages between when he disconnects from Hospital ABC's Wi-Fi internet connection and before he connects to ABC Clinic's Wi-Fi internet connection ifhe does not have a cellular data connection to fill in during that time frame.

Wi-Fi Connection without an Internet Connection

In some cases, cellular devices can have a Wi-Fi connection without establishing an internet connection. In this situation, the device could be able to successfully connect to the local area network that is providing the Wi-Fi

connection, but the local area network could be preventing the device from establishing a successful connection with the Wi-Fi's internet connection.



Some causes of a local area network preventing devices who are connected to its access point from accessing the access point's internet connection include the following:

- Access list restrictions
- Firewall rule restrictions
- Proxy rule restrictions

For example, Dr. Miller leaves Hospital ABC to pick up a cup of coffee from his local coffee shop. When Dr. Miller enters the local coffee shop, his device can automatically connect to the coffee shop's Wi-Fi connection and local area network. However, the coffee shop's configuration requires that users enter the username and password for the connection before they can access the coffee shop's internet.

In this case, Dr. Miller's device would display that it has a Wi-Fi connection; however, his device would not have an internet connection until he enters the required username and password for the internet. This could cause Dr. Miller to miss Spok Mobile messages during the time frame that his device turns off its cellular data connection because it believes that he has a Wi-Fi internet connection and when he authenticates to the coffee shop's Wi-Fi connection and the local area network allows him to connect to the internet.

Cellular Internet Connections

Cellular Internet Disabled

In some cases, cellular internet coverage can be disabled on the device. When a device is set to not attempt to establish a connection to cellular data, the device must have a successful Wi-Fi internet connection established in order to receive Spok Mobile messages. Devices can be prevented from having cellular internet connections for the following reasons:

- Cellular data disabled
- Airplane mode enabled
- Carrier is not providing a connection (the carrier could prevent a connection for many reasons)

Cellular Carrier/Tower Roaming

Some cellular providers allow devices to connect to the cellular towers of other cellular providers. For example, if a Sprint device is not close enough to a Sprint cellular tower to be able to establish a connection with cellular data but it is very close to a Verizon cellular tower that would allow it to establish a cellular data connection, the Sprint device is sometimes allowed to connect to Verizon's cellular tower. When this happens, the device that is connecting to a tower that is not provided by its cellular provider, can experience very limited cellular data. Because the connection and available cellular internet connection is so limited, this can prevent devices from receiving Spok Mobile messages.

Cellular Tower Proximity

In some cases, when devices are too close to a cellular tower that provides cellular data coverage to the device, the device's internet loses the cellular data coverage from that tower. In this case, the device can miss Spok Mobile messages because it no longer has a cellular data connection established.

Transitioning Between Internet Connections

When devices are transitioning between internet connections, devices can experience periods of time without internet coverage.

Transitioning Between Cellular and Wi-Fi Connections

Devices can experience breaks in internet coverage when transitioning from cellular to Wi-Fi internet connections and from Wi-Fi to cellular internet connections. These breaks in coverage could prevent devices from receiving Spok Mobile messages.

For example, if Dr. Miller leaves Hospital ABC where he has a successful Wi-Fi internet connection established to his car where he does not have access to a Wi-Fi connection but does have access to cellular data coverage, there may be a period of time where his device is transitioning from available internet coverages that prevents his device from establishing a successful internet connection.

Additionally, if Dr. Miller is walking from his car where he has a successful cellular data internet connection to Hospital ABC where he can established a successful Wi-Fi internet connection, there may be a period of time when his device is transitioning from cellular data coverage to a Wi-Fi internet connection where his device would not have an internet connection.

Transitioning Between Cellular Connections

Devices can also experience breaks in internet coverage when devices are transitioning from cellular tower to cellular tower. There is a period of time when devices leave one cellular tower but have not yet established a successful connection to another cellular tower that causes a break in the device's internet coverage. These breaks in coverage could prevent Dr. Miller from receiving Spok Mobile messages.

For example, if Dr. Miller is driving in his car and his device geographically leaves the range of the cellular tower that he was connected to, his device can experience a period of time where his device is transitioning from one cellular tower to another cellular tower where his device would not have cellular data coverage.

Transitioning Between Wi-Fi Connections

Devices can experience breaks in internet coverage when devices are transitioning from a Wi-Fi connection to another Wi-Fi connection. There is a period of time where devices leave one Wi-Fi internet connection but have not yet established a successful connection to another Wi-Fi connection that causes this break in the device's internet coverage. These breaks in coverage could prevent devices from receiving Spok Mobile messages.

For example, if Dr. Miller is currently connected to the city of Minneapolis's public Wi-Fi internet connection but he has to drive out of the city of Minneapolis to the city of St. Paul, there is a period of time between when Dr. Miller's device leaves the city of Minneapolis's public Wi-Fi internet connection and when his device is able to connect to the city of St. Paul's public Wi-Fi internet connection when his device would not have a successful Wi-Fi internet connection established.