What are Adhoc Wireless LANs ? - A Viewpoint

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In this short contribution, we explore the concept of Adhoc Wireless LAN networks. We outline what we regard as a list of important properties and requirements of an Adhoc WLAN. Our purpose is to promote a discussion on Adhoc WLANs and solicit input for refining the concept of Adhoc WLAN. The contribution is related to Issue 4.1 in Doc. IEEE P802.11/92-64.

Adhoc WLAN networks are created to facilitate spontaneous communication between mobile stations *without* relying on the existence of any communication infrastructure. Some of the desirable end-user requirements and/or expectations from an Adhoc WLAN network include the following:

- From an end-user point-of-view, the main requirement/expectation of an Adhoc WLAN is that it enables spontaneous communication between mobile stations even when there is no preexisting network.

- Communicating entities, when interacting, should have a peer-to-peer appearance. Excessive burden should not be placed on any mobile station in order to operate the Adhoc WLAN network.

- Permit colocated, autonomous operation of multiple Adhoc WLANs within the same geographic area.

Additional desirable requirements on Adhoc WLANs include:

- Use the same MAC function as in an Infrastructure-based WLAN. This allows one to capitalize on a single implementation regardless of the operating environment (Infrastructure-based or Adhoc-based WLAN).

- Maximum range of geographic coverage possible.

- Provides the same functions of registration, access control, authentication, privacy and management that are available in Infrastructure-based WLANs.

There are at least three ways to construct Adhoc WLAN networks.

1. Centralized Control A designated station provides timing, control and bandwidth allocation functions. The station may or may not be involved in data transfer between peer stations within direct communication range of each other. Range extension (i.e., geographic coverage) of the Adhoc WLAN is provided by including store-and-forward capability in the station. The role of the designated station is associated with only a single station during the lifespan of the Adhoc WLAN.

2. Distributed Centralized Control At any given instant in time, a single station is designated to perform the central control functions as in Option 1 above. However, the role of the designated station is not permanently associated with the single station. During the lifespan of the Adhoc WLAN, the role of the designated station is rotated among a set of stations that can provide the control functions.

3. Distributed Control At any given instant in time, there is no single station that performs alone all the control functions essential for Adhoc WLAN operation. Timing, control and bandwidth sharing are all performed using a fully distributed control scheme.