



---

# CAPWAP Protocol Concerns

---

*Richard Gwee*  
*Republic Polytechnic*  
*richard\_gwee@rp.sg*

# Agenda

---

- Issue #1: Changes in CAPWAP State Machine
- Issue #2: Load Balancing for WTP
- Issue #3: General Statistics for CAPWAP
- Issue #4: Firmware Trigger

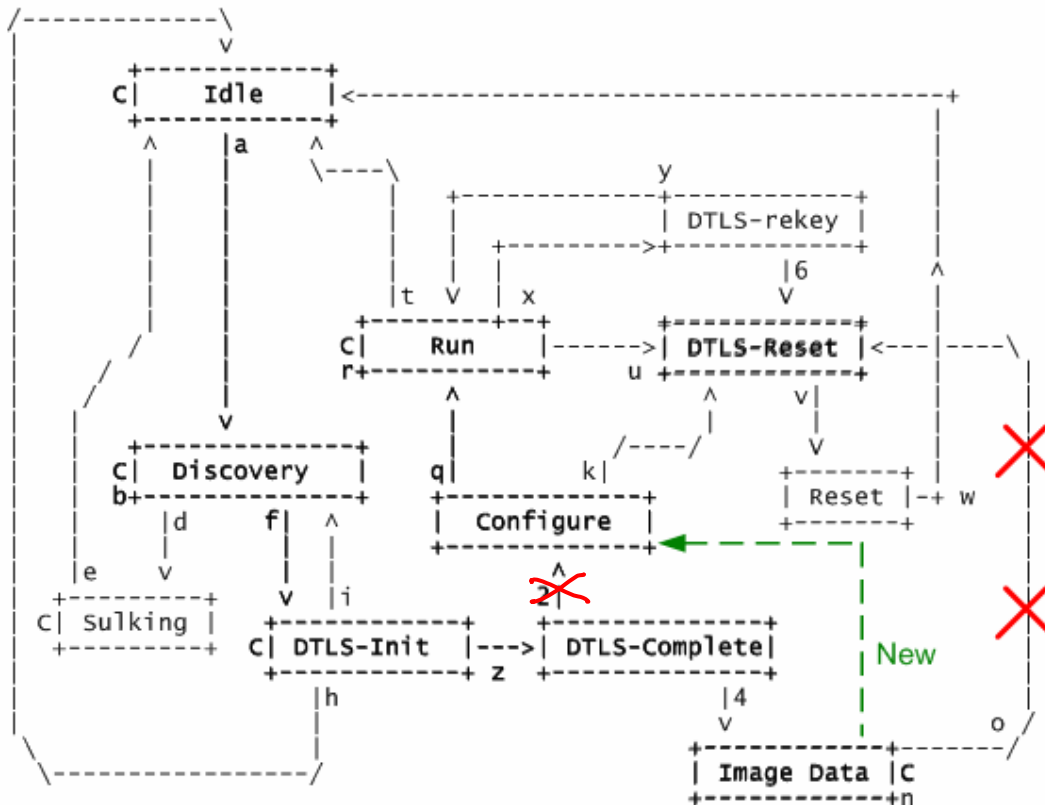
# Changes in CAPWAP State Machine

---

- State Machine specified in draft requires details.
- There is no clear indication on how the transition goes from DTLS-complete state to Configure state or Image Data state.
- There should be clear basis on how the protocol should handle the various states.

# Changes in CAPWAP State Machine

- Suggestion:- To change the state machine as in the following figure.



# Load Balancing for WTP

---

- In Section 5.2.4 and 5.2.5 WTP Manager Control, it has been stated that the message element is useful for load balancing.
- Message element only contains IP addresses and WTP count.
- Are such information sufficient to provide effective load balancing?

# Load Balancing for WTP

---

- Suggestion:- To introduce more parameters in the message element for WTP manager.
- Other than IP addresses & WTP count, we should include
  - Traffic loading
  - Network Congestion
  - Etc.

# General Statistics for CAPWAP

---

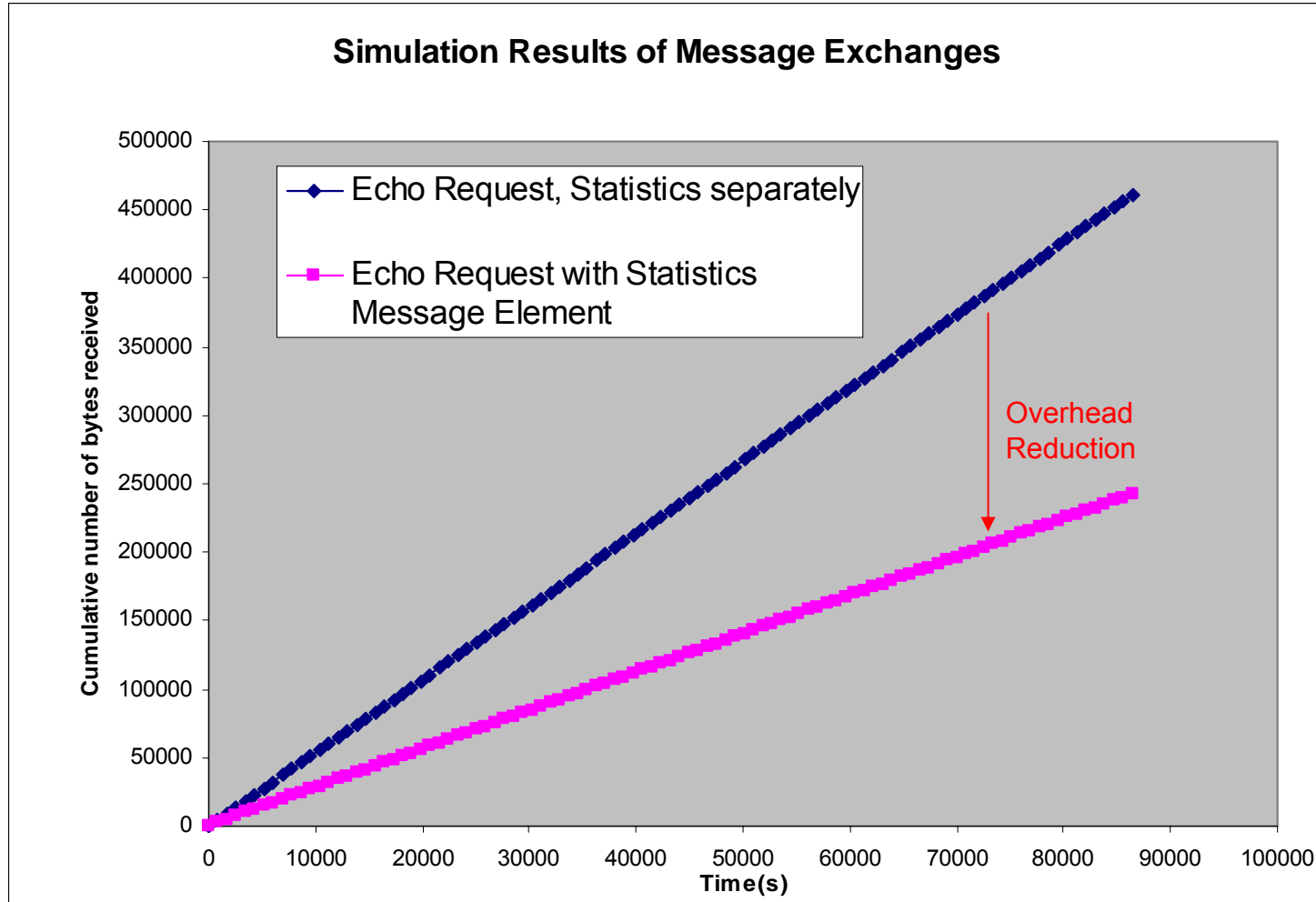
- The CAPWAP protocol needs regular statistics exchange.
- Statistics should be applicable for the overall network, e.g. congestion, traffic loading, channel interferences etc.
- Size of statistics element  $\approx 4 - 8$  bytes.
- Echo Request is regularly exchanged between WTP and AC.

# General Statistics for CAPWAP

---

- Suggestion:- To include general statistics message elements in the Echo Request message.
- Suggestion made in CAPWAP Comparative Analysis. (Section 4.6.1)

# General Statistics for CAPWAP



# Firmware Trigger

---

- No clear indication of periodic firmware trigger in the State Machine
- Firmware Management optional in CAPWAP draft specification (Section 4.3)
- Firmware updates should be periodic and on a proactive basis so as to ensure consistent firmware version across the network.

# Firmware Trigger

---

- Suggestion:- To introduce periodic firmware trigger in CAPWAP protocol.
- Firmware Management should be mandatory.
- Suggestion made in CAPWAP Comparative Analysis. (Section 4.1.5)