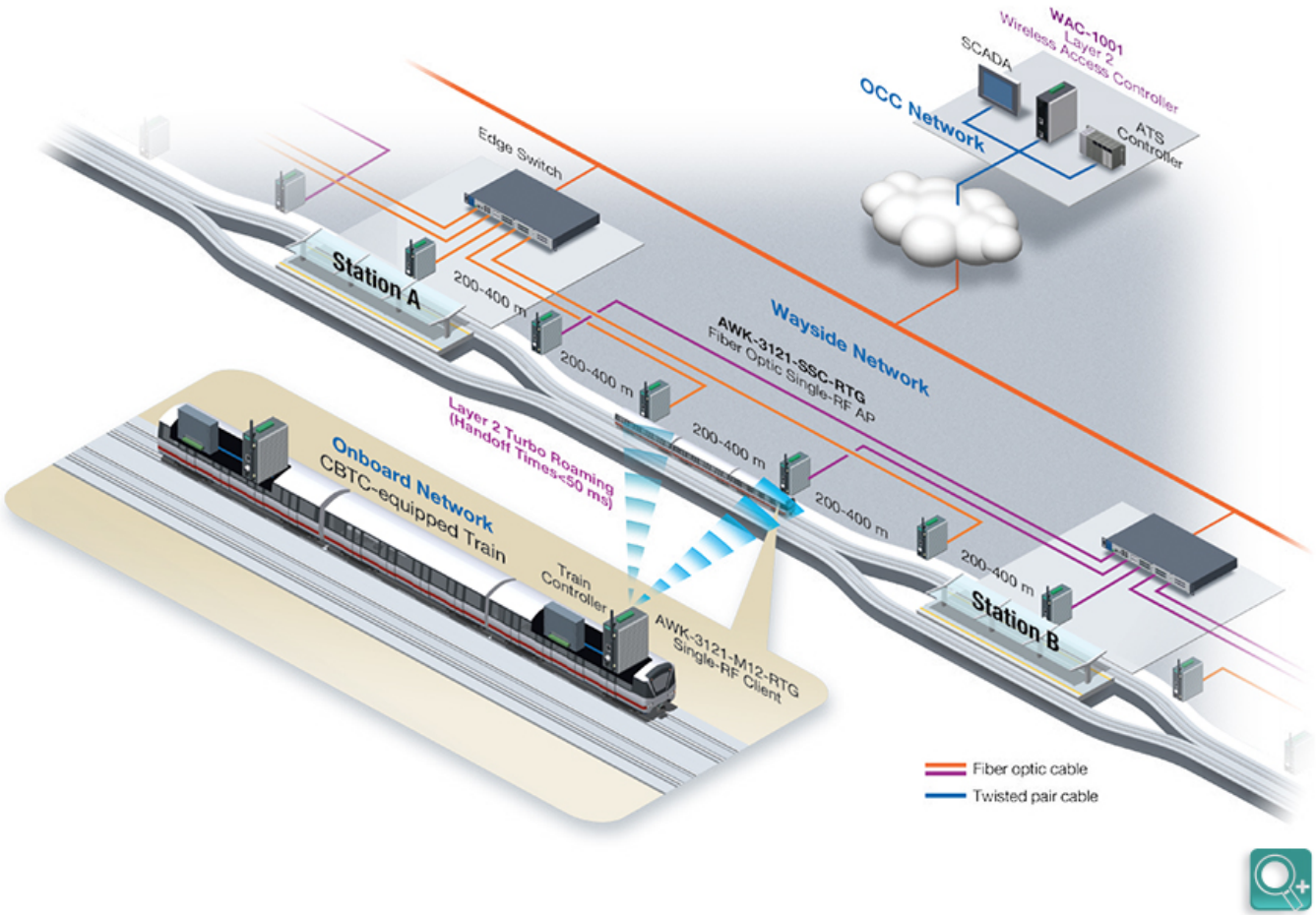
Layer 2 CBTC - Minimized Headways with Safe Operations for CBTC

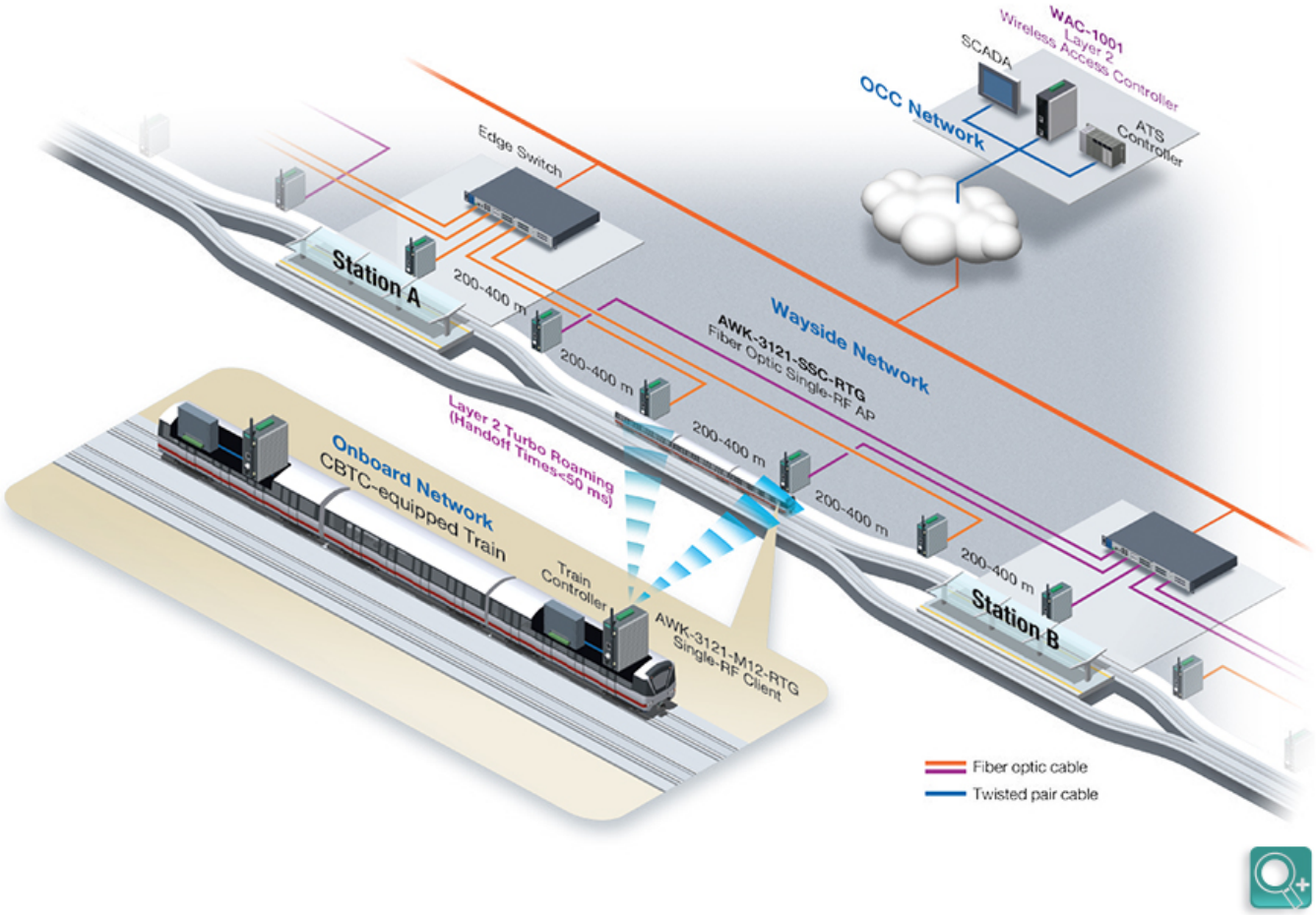
Minimized Headways with Safe Operations for CBTC



Minimized Headways with Safe Operations for CBTC

CBTC uses constant bi-directional radio communications between train and trackside equipment to increase line capacity by reducing headways. To do this, the moving block train control system needs real-time train operating data to enforce safe spacing. Any communications loss may disrupt the CBTC and bring trains to a stop. Consequently, CBTC networks have strict standards for availability and latency. In metro lines, frequent train roaming may cause long latency in RF-based CBTC networks. A roaming handoff time of less than 50 ms is vital for uninterrupted trainto-trackside connectivity. Momentary breaks may occur on radio networks; but

a CBTC can only tolerate a packet loss rate of under 0.1%.



Network Requirements

- Fast secure roaming:
  - Handoff of less than 50 ms for continuous CBTC operations
- Sufficient throughput:
  - 4 Mbps throughput to support all CBTC functions
- Error tolerance:
  - Packet loss rate of less than 0.1%
- Network latency:
  - Maximum latency of 5 ms to achieve overall CBTC performance

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- Layer 2 Turbo Roaming (handoff <50 ms):
    - WAC-1001 wireless access controller enables rapid roaming with centralized security
    - 3 non-overlapping channels of roaming for less interference
    - Packet loss rate of under 0.1%
- Network latency under 1 ms
- Stable throughput: 4 Mbps of throughput
- Roaming diagnosis service