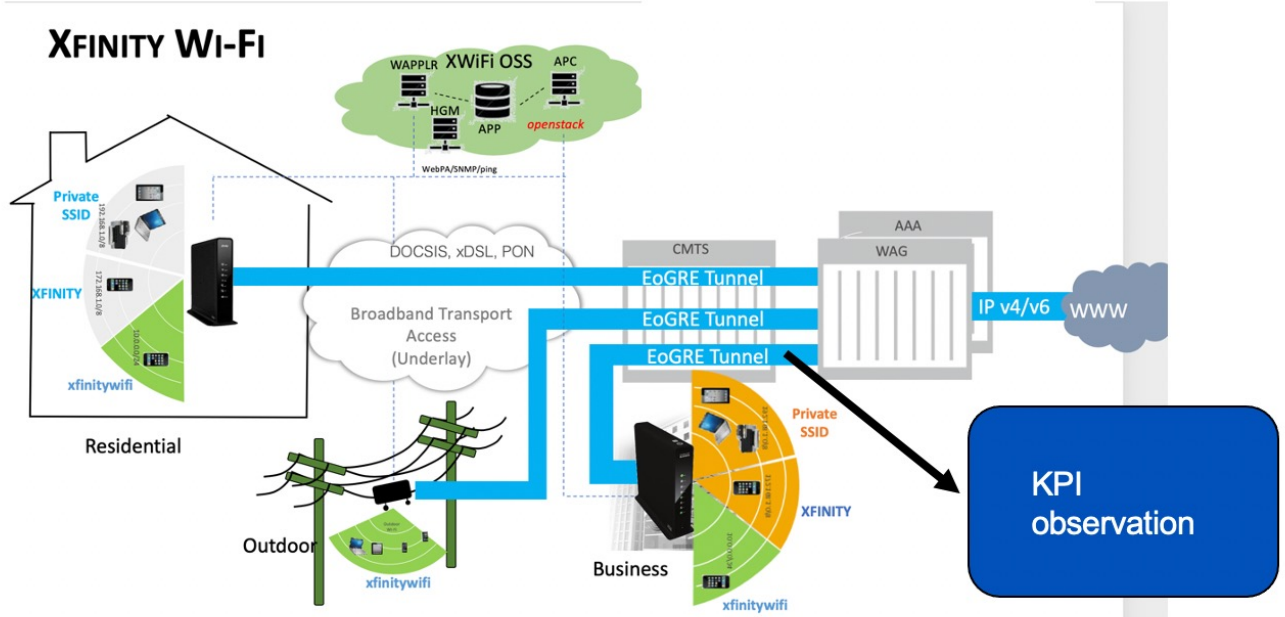
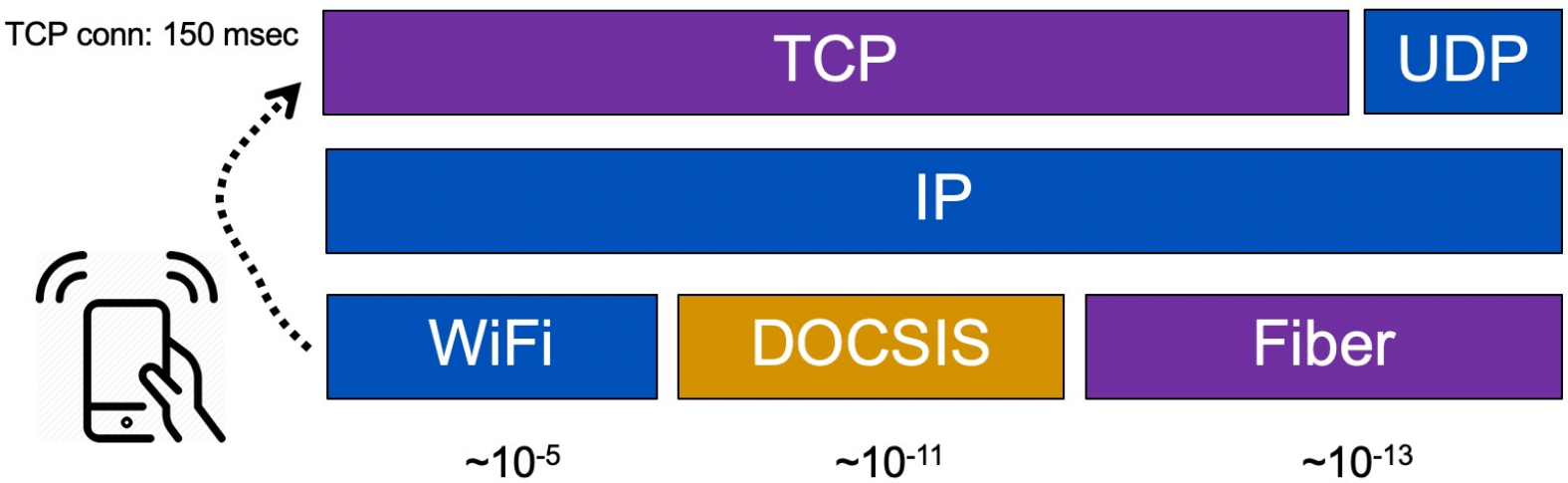
Using TCP Connect Latency for measuring CX and Network Optimization

Network Quality workshop
Comcast



QoE KPI

TCP conn: 150 msec



WiFi connection quality can be observed at Layer 4
by observing TCP connect latency

CX KPI Predictors

- **TCP connect Latency**: This is our Primary Latency predictor KPI. It is measures from SACK→ACK, as round trip from network to client and back.

- **TCP Retransmission**: This is our secondary KPI that we are evaluating as a predictor of characterizing good/bad sessions. This is measured for the **entire lifetime** of tcp connection NOT just the start. This marker at 4% is candidate for the CX predictor (specially for mobility / nomadic scenarios where wireless channel quality variability due to motion creates excessive L2 delays which in turn creates retransmissions at TCP layer.

- **Throughput**: Throughput is measured as actual consumed in octets on a 1 second interval granularity. {*Not to be confused with a synthetic speedtest that tests the max capacity capability of a connection*}

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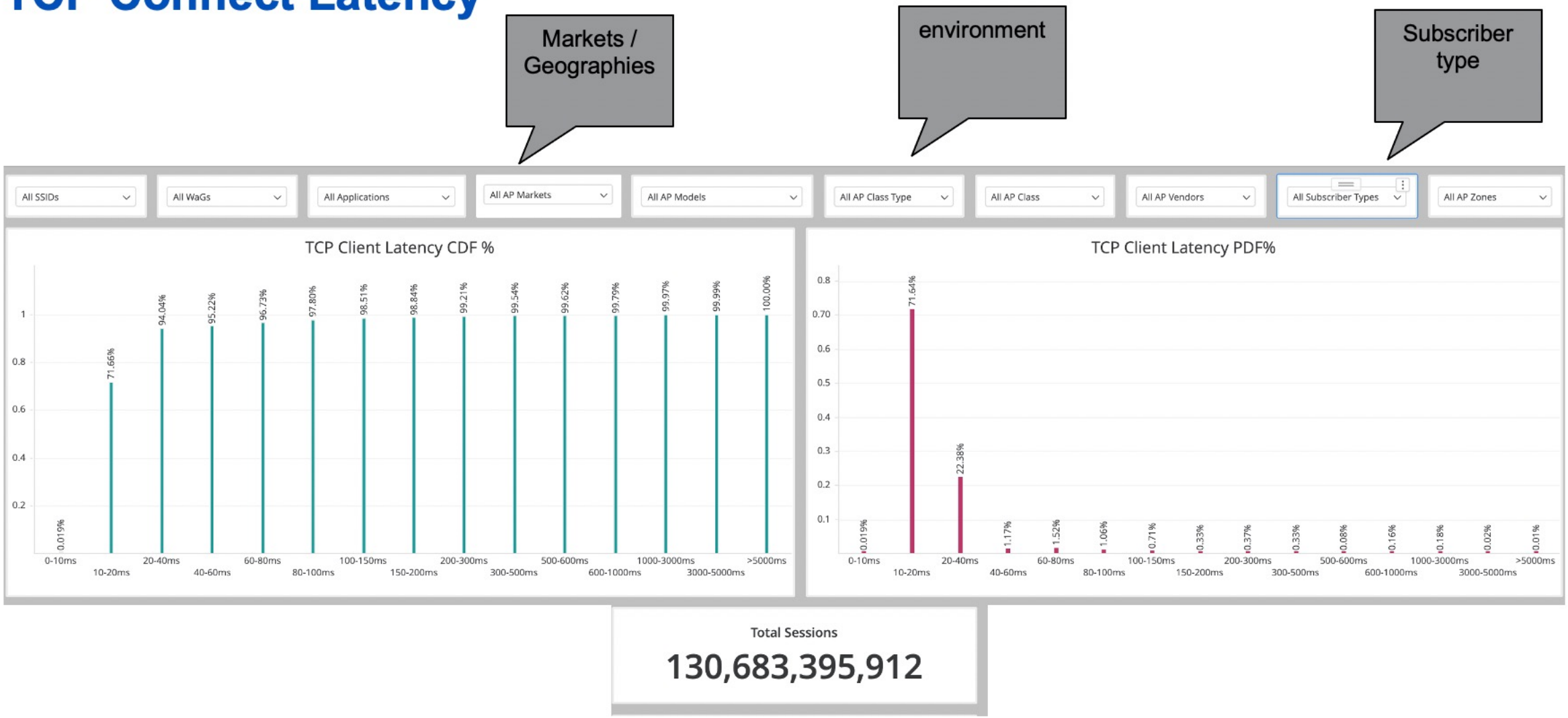
TCP Connect Latency



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TCP Retransmissions

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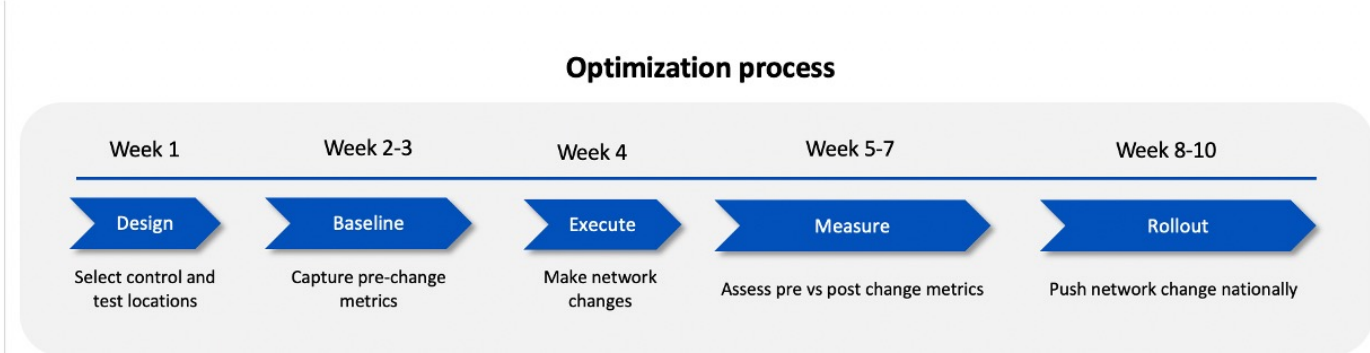
CX / Latency improvement methodology

- Conduct Network A/B tests for network optimization
  - Pick A & B sites of very similar traffic and usage profiles.
  - Site A is the Control site
  - Site B is the Test site
  - Baseline and trend KPIs on both sites for fixed duration of time (usually 2 weeks)
  - Make the CX based Network Optimization change only on the Test site
  - Let the Test site (site B) soak the change for a fixed duration of time (usually 1-2 weeks)
  - Start trending KPIs on both control and test sites during post baseline and soak phase for a fixed duration of time (usually 2 weeks)
  - Analyze the network optimization KPI outcome on test site as compared to control site.
  - If KPI trends are favorable on various KPI statistical models, then deploy the change nationwide.

  - Wash, rinse , repeat.