How to avoid killing the wireless internet with your phone
Patrick Verkaik, Yuvraj Agarwal, Alex C. Snoeren
contact: pverkaik@cs.ucsd.edu

Voice-over-IP in WiFi

Voice-over-IP = telephony over Internet

Internet café offering WiFi

Internet

Access point

VoIP over WiFi

WiFi VoIP phone

But now add more callers...

More airtime wasted on collisions and backoff

Less airtime for e.g. web users

Current impact on TCP

Reduced Impact on TCP

1. Prioritise (no backoff) and schedule outgoing VoIP
   Note: no collisions

2. Access point aggregates incoming VoIP, saving overhead
   No changes to non-VoIP computers at all

To transmit data:
1. Wait for everyone to be quiet
2. Wait a bit more (back off)
3. Transmit
4. In case of a collision, back off more, then retry

WiFi contention procedure

Voice-over-IP = telephony over Internet

Internet café offering WiFi

Internet

Access point

VoIP over WiFi

WiFi VoIP phone

Current impact on TCP

Reduced Impact on TCP

1. Prioritise (no backoff) and schedule outgoing VoIP
   Note: no collisions

2. Access point aggregates incoming VoIP, saving overhead
   No changes to non-VoIP computers at all

To transmit data:
1. Wait for everyone to be quiet
2. Wait a bit more (back off)
3. Transmit
4. In case of a collision, back off more, then retry

WiFi contention procedure

Expected (from size of VoIP packets)

Measured (802.11b)

TCP capacity destroyed!

TCP throughput (KB/s)

# voip phones

Current

Voice-over-IP = telephony over Internet

Internet café offering WiFi

Internet

Access point

VoIP over WiFi

WiFi VoIP phone

But now add more callers...

More airtime wasted on collisions and backoff

Less airtime for e.g. web users

Current impact on TCP

Reduced Impact on TCP

1. Prioritise (no backoff) and schedule outgoing VoIP
   Note: no collisions

2. Access point aggregates incoming VoIP, saving overhead
   No changes to non-VoIP computers at all

To transmit data:
1. Wait for everyone to be quiet
2. Wait a bit more (back off)
3. Transmit
4. In case of a collision, back off more, then retry

WiFi contention procedure

Expected (from size of VoIP packets)

Measured (802.11b)

TCP capacity destroyed!

TCP throughput (KB/s)

# voip phones

Current

Voice-over-IP = telephony over Internet

Internet café offering WiFi

Internet

Access point

VoIP over WiFi

WiFi VoIP phone

But now add more callers...

More airtime wasted on collisions and backoff

Less airtime for e.g. web users

Current impact on TCP

Reduced Impact on TCP

1. Prioritise (no backoff) and schedule outgoing VoIP
   Note: no collisions

2. Access point aggregates incoming VoIP, saving overhead
   No changes to non-VoIP computers at all

To transmit data:
1. Wait for everyone to be quiet
2. Wait a bit more (back off)
3. Transmit
4. In case of a collision, back off more, then retry

WiFi contention procedure

Expected (from size of VoIP packets)

Measured (802.11b)

TCP capacity destroyed!

TCP throughput (KB/s)

# voip phones

Current

Voice-over-IP = telephony over Internet

Internet café offering WiFi

Internet

Access point

VoIP over WiFi

WiFi VoIP phone

But now add more callers...

More airtime wasted on collisions and backoff

Less airtime for e.g. web users

Current impact on TCP

Reduced Impact on TCP

1. Prioritise (no backoff) and schedule outgoing VoIP
   Note: no collisions

2. Access point aggregates incoming VoIP, saving overhead
   No changes to non-VoIP computers at all

To transmit data:
1. Wait for everyone to be quiet
2. Wait a bit more (back off)
3. Transmit
4. In case of a collision, back off more, then retry

WiFi contention procedure

Expected (from size of VoIP packets)

Measured (802.11b)

TCP capacity destroyed!

TCP throughput (KB/s)

# voip phones

Current

Voice-over-IP = telephony over Internet

Internet café offering WiFi

Internet

Access point

VoIP over WiFi

WiFi VoIP phone

But now add more callers...

More airtime wasted on collisions and backoff

Less airtime for e.g. web users

Current impact on TCP

Reduced Impact on TCP

1. Prioritise (no backoff) and schedule outgoing VoIP
   Note: no collisions

2. Access point aggregates incoming VoIP, saving overhead
   No changes to non-VoIP computers at all

To transmit data:
1. Wait for everyone to be quiet
2. Wait a bit more (back off)
3. Transmit
4. In case of a collision, back off more, then retry

WiFi contention procedure

Expected (from size of VoIP packets)

Measured (802.11b)

TCP capacity destroyed!

TCP throughput (KB/s)

# voip phones