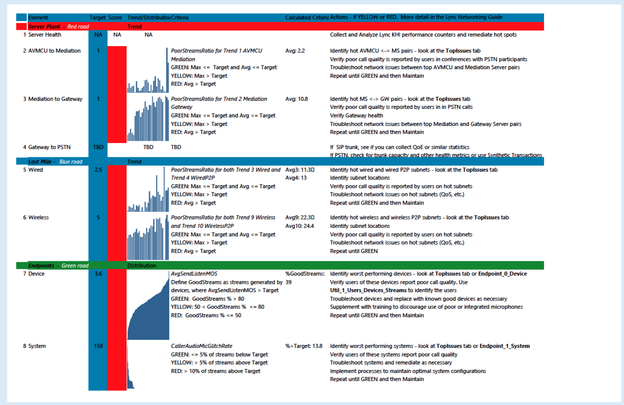
Skype for Business Call Quality Methodology

CQM: Three Roads to Improving Voice Experience

This poster is a companion visual to CQM as defined in the Call Quality Methodology Scorecard available here:

Prioritize: Run The CQM Scorecard

The first step in CQM is to run the CQM scorecard and analyze the results. Start with the Stream Distribution charts. The bar chart shows you the highest stream counts by category in green and the poor streams in red. The pie chart shows a breakout of all the poor stream types so you can pick the biggest contributor. Prioritize corrective action by the largest stream contributor, the highest poor stream ratio, and managed areas (ones you control). If the AVMCU or Mediation categories show poor results, start on the Red or Server Plant road. If the Wired or Wireless categories show poor results, start on the Blue or Last Mile road. If the VPN or Device rows show poor results, start on the Green or End Points road.
After you choose a road to start with, define a target for each area (**Assert**), work to meet that target (**Achieve**) and then implement procedures to stay on target (**Maintain**). You can also use this poster as a game to understand the principles behind CQM.



KHI

The first thing to look at on the Server Plant Road is the health of your Skype for Business servers. See the companion poster.

The Server Plant Road

Start

Assert: Use Health definitions in KHI spreadsheet

Achieve

Maintain

When you are confident your Skype for Business Servers are running well, look at how media streams between servers are doing.

Assert (suggest PoorStreamsRatio < 1%)

Achieve

Maintain

Use detailed queries to find AVMCU and Mediation server pairs with poor streams:

- Investigate cause of poor streams
- Look at network equipment in the poor stream paths.
- Remediate poor streams
- Define optimal or "gold" configuration for network equipment

Determine your target for poor stream thresholds. Poor streams are:

PacketLossRate > .01

Implement process and tools to manage configuration drift.

Assert (suggest PoorStreamsRatio < 1%)

Achieve

Maintain

Determine your target for poor stream thresholds. Poor streams are:

PacketLossRate > .01

Use detailed queries to find Mediation and Gateway server pairs with poor streams:

- Investigate cause of poor streams
- Look at network equipment in the poor stream paths
- Remediate poor streams
- Define optimal or "gold" configuration for network equipment

Implement processes and tools to manage configuration drift and to report new problem areas.

Assert (Relevant Gateway statistics)

Achieve

Maintain

Remediate problematic Gateways and define the optimal or "gold" configuration.

Implement process and tools to manage gateway configuration drift and to report new problem areas.

Identify the Gateway Statistics that show health and define targets against them.

1: Server Plant-Server Health

2: Server Plant -AV MCU Server to Mediation Server Streams

3: Server Plant - Mediation Server to Gateway Streams

4: Server Plant - Gateway Health

Service Management

Congratulations! You have reached the end state of CQM. To maintain high levels of call quality, monitor these areas:

1. **Users** - Remediation activities should show a measurable increase in user satisfaction. You can measure this by problem tickets or other feedback mechanisms. If you are on SfB server, use the Rate-my-Call reporting to verify user satisfaction.

2. **Process** - define daily, weekly and monthly processes to operationalize CQM. Monitoring rhythm starts at a higher frequency while you are remediating (daily) and moves to a lower frequency (monthly) as you stabilize.

3. **Tools** - identify tools to both measure and remediate. Regularly run the CQM Scorecard or CQD if you are on SfB and the KHI Analysis and Definitions Workbook to support your processes. Remediation may require additional tools for example to enforce standardized configurations on network elements or troubleshooting loss in poor streams.

4: End Points – Media Transport

Assert (Suggest < 1% media streams over TCP)

Achieve

Maintain

Identify problem subnets and investigate firewall rules, packet shapers and other relevant network equipment configuration.

IP Packets can use either Transmission Control Protocol (TCP) or User Datagram Protocol (UDP). TCP is optimal for data streams. UDP is connectionless and is more efficient for media since TCP recovery mechanisms cannot address loss in real time media. Skype for Business always prefers UDP, but will revert to TCP if a UDP session cannot be established. Media sessions over TCP will exhibit poorer quality than over UDP.

The network path an audio stream takes from a Skype for Business endpoint can cause poor audio quality.

If audio travels over a VPN connection you might see latency issues. If an internal Skype for Business client cannot establish a direct media stream to another internal Skype for Business client for a two-party or peer-to-peer call, it will fall back to a path that relays through a Skype for Business Edge server, again leading to latency issues as well as increased potential for loss and jitter.

3: End Points – Media Path

Assert (Suggest <1% media streams over VPN)

Achieve

Maintain

Identify problem subnets and investigate firewall rules, packet shapers, and other relevant network equipment configuration.

2: End Points - System

Assert (suggest AudioMic GlitchRate < 150 for > 95% of streams)

Achieve

Maintain

Define "golden" PC configuration including driver versions.

The device or PC processing the audio for a call is the system in this context.

1: End Points - Devices

Assert (suggest AvgSendListen MOS 3.6 for>80% of streams)

Achieve

Maintain

Identify problematic devices and come up with strategy to fix or replace.

Users must be sure to use headsets and other devices known to produce acceptable quality when used with Skype for Business.

The End Points Road

Start

After you optimize the quality of your wired connections, improving wireless quality becomes easier because the wireless infrastructure sits atop the wired core at each location. Poor wireless streams in a site with good wired quality must be attributed to the specific wireless components. The CQM Wireless query (*LastMile_1_Wireless*) operates on a date range and will return all internal wireless streams in your environment from Skype for Business clients to or from either conferencing servers or mediation servers.

2: Last Mile – Wireless

Assert (suggest PoorStreamsRatio < 5% for sites with > 300 streams)

Achieve

Maintain

Remediate subnets ordered from worst to best.

Implement QoS.

1: Last Mile – Wired

Assert (suggest PoorStreamsRatio < 2.5% for sites with > 300 streams)

Achieve

Maintain

Remediate subnets ordered from worst to best.

Implement QoS.

The Last Mile Road

Of the two ways clients connect to the network, wired is expected to deliver the highest quality and correspondingly this must be your initial focus for last mile issues. Use the CQM Wired query (*LastMile_0_Wired*) and the Poor Streams ratio data it provides.

Start

Managed/Unmanaged

The Skype for Business Server deployment and network infrastructure can usually be divided into *managed* and *unmanaged* spaces.

The managed space includes your entire inside wired network and server infrastructure. The unmanaged space is the wireless infrastructure and the outside network infrastructure.

Making this distinction increases the clarity of your data and helps your organization focus on workloads that will have a measurable impact on your users' voice and video quality.

Users have a different expectation of quality if the call is placed on infrastructure that you own (managed) versus infrastructure that is partly under the control of some other entity (unmanaged). This is not to say that wireless users are left to their own devices to have excellent Skype for Business Server experiences.

Improving voice quality in the unmanaged space requires you to have high quality in the managed space. Whether wireless (Wi-Fi) is considered managed or unmanaged space is up to your organization. The techniques to achieve a healthy environment are different in the two spaces, as are the solutions.

PCD

The PreCall Diagnostics tool (PCD) developed for Lync 2013 works with Skype for Business and will help you identify and diagnose problems in your perimeter network (the QoE database doesn't collect information on your edge or perimeter network) and also to troubleshoot connections in the Last Mile. The tool is available as both a Windows 8 Modern App or a Windows Desktop App.

Place Cards Here

The Rules

You can use this poster either as a reference to a CQM implementation or as a game to practice the concepts. To play, you will need one six-sided die and the cards provided. A downloadable version of the cards is available to print on standard Avery 5871 business cards.

The game is for 3 players. There are three paths the players can use to achieve the desired quality and reach the center Service Management state: Server Plant, End Point, and Last Mile. Each path has stops along the way where you **Assert** quality targets, **Achieve** goals, and **Maintain** an aspect of your system. Place the cards in the indicated area above, and then draw 5 cards. Review the cards you've drawn and place them on the relevant board segment. Each player moves through the cards on their path step by step, asserting quality targets, achieving those targets, and maintaining the service levels. The game is completed when all players reach the center Service Management state. More detailed rules are provided with the game card download.

Assert — To **Assert** a quality target, review the parameters applicable to that target, and state out loud what you will and won't choose to accept. We have recommended beginning points, but you must make the final call. The exception is KHI data, where the standards established by Microsoft should be used. See the accompanying KHI poster.

Achieve — To **Achieve** in the game, use the cards provided in place of KHI data and system queries. If at the start of the game you did not draw a card relating to a given aspect, you can continue past it. If there is a relevant card, roll the die. If you rolled under the number indicated on the card, you have succeeded. If you roll at or over the indicated number, you must draw another card from the deck. If the card indicates two or more players need to roll, they must all roll successfully.

Maintain — To **Maintain** in the game, state out loud the service management plan regarding that aspect of the Skype for Business environment.

Search the download center for this poster to get the cards used to play this game.

Skype for Business

Microsoft