A Real-World Demonstration of Nectar’s Unified Communications Diagnostics (UCD) for Microsoft Lync
# Table of Contents

Introduction .............................................................................................................................................................................. 3
The Business Problem ................................................................................................................................................................. 3
Why Probe-Based Solutions Don’t Work ........................................................................................................................................ 3
The Nectar Solution ......................................................................................................................................................................... 4
Reducing Complexity in Managing the Lync and Hybrid UC Network .......................................................................................... 6
Accurate Forensics and Correlation ............................................................................................................................................. 6
Quicker Root Cause Analysis and Time to Resolution .............................................................................................................. 6
Trend Analysis and Reporting ....................................................................................................................................................... 6
The Nectar UCD and Microsoft Lync Demonstration ............................................................................................................... 7
Nectar: Because Correlation Matters ............................................................................................................................................ 11
Introduction

Microsoft Lync connects people everywhere as part of their everyday productivity experience. When issues in the underlying IP network affect a user’s Lync experience, unified communications (UC) managers need to solve those problems immediately. The solution to these issues lies in the tight integration with Lync services that captures all the data responsible for identifying the root cause behind Lync-specific UC problems. Unfortunately, many service assurance solutions on the market today fall short and do not capture all the information necessary or automatically correlate related issues back to these root causes. In addition, the number of costly third-party probes required at each endpoint in a Lync UC routed network can exceed what many companies can afford. Only Nectar’s Unified Communications Diagnostics (UCD) module provides comprehensive insight into Lync UC network issues for fast problem resolution without expensive probes, lowers the total cost of ownership (TCO) and increases the quality of Lync user experience.

- There is no visibility of the routed network
- Most solutions require expensive probes in multiple locations
- Lync media and signaling data is encrypted and cannot be seen
- Issue triage and correlation is extremely manual
- Lack of proper “bracketing” of the source of the problem leads to constant misleading finger-pointing
- Post-event averages of call quality metrics don’t present an accurate, real-time picture of the call
- Poor end-user experience cannot be resolved quickly, or in some cases, at all

This paper will discuss how UCD’s unique integration with the Microsoft Lync Software Defined Network (SDN) API can provide the insight required to anticipate, isolate and remediate voice, video and data issues in Lync and hybrid UC environments. It also describes a demonstration of how UCD resolves Lync issues in a real-world scenario.

The Business Problem

According to Microsoft Lync customer experiences, a large majority of issues related to Lync UC problems occur within the client-routed network. Most commonly, there is configuration drift — when client locations change or applications expand, QoS settings on the routers become obsolete. Traditional UC network service assurance monitoring solutions use an element monitoring or probe approach to identify the root cause of service degradations. This approach does not accurately provide insight into what the user experiences during that event, nor does it automatically correlate the disparate data into actionable insight for root cause and trending analysis.

Why Probe-Based Solutions Don’t Work

Even when using traditional probe-based monitoring methods, most IT operations managers are plagued with the following issues when trying to resolve Lync UC service problems:

- Without an effective means of quickly identifying and correlating network issues to the session and content

A female user (User 1) in the corporate office calls a male user (User 4) in the remote branch site. The audio of a phone call is breaking up and the female user cannot be understood.
Nectar’s UCD module for Microsoft Lync 2013 and 2010 is more than just monitoring; it provides complete IP network information correlation for Lync environments. UCD automatically correlates, in real-time, all session, content and IP topology data to each user call, enabling managers to quickly anticipate, isolate and remediate the root causes of network-based UC problems. From disparate components. Fault isolation also depends on the hope that the same root cause event will happen while the after-the-fact diagnostics traces are enabled. After days or weeks of hunting, the root cause “needle” is rarely found.

The Nectar Solution

Nectar’s UCD module for Microsoft Lync 2013 and 2010 is more than just monitoring; it provides complete IP network information correlation for Lync environments. UCD automatically correlates, in real time, all session, content and IP topology data to each user call, enabling managers to quickly anticipate, isolate and remediate the root causes of network-based UC problems. UCD delivers immediate insight into underlying IP networks without costly probes at each endpoint and without burdening the performance of all Lync elements with post-event diagnostic traces.

UCD for Lync correlates Content, Session and Topology Metrics in Real-Time

Complete View of the End-User Experience

<table>
<thead>
<tr>
<th>Content Metrics</th>
<th>Session Metrics</th>
<th>Topology Metrics</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Network Packet Loss</td>
<td>- Session Attempts</td>
<td>- Hop-by-Hop tracking</td>
</tr>
<tr>
<td>- Jitter / Buffer Drops</td>
<td>- Success Rate</td>
<td>- Interface congestion</td>
</tr>
<tr>
<td>- R-Factor / MOS</td>
<td>- Errors / PCAP files</td>
<td>- Path / Route Changes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Packet Loss</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- QoS Analysis</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Microsoft SDN API + Nectar UCD</td>
<td>Nectar Unique Visibility</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

UCD for Lync correlates Content, Session and Topology Metrics in Real-Time
Empowering Microsoft Lync users with the enhanced optimizations that UCD provides begins with Nectar incorporating support for the new and powerful Microsoft Lync Software Defined Network (SDN) API into its patented IP Correlation Engine® (ICE). This API enables UCD to provide real-time, hop-by-hop IP topology path identification and recording of all media streams for all Lync voice and video calls down to the Lync user endpoint. The identification of specific route paths in real-time for each session allows support personnel to correlate a user’s complaint to the likely root-cause of service degradation within a few clicks, significantly reducing the time to resolve issues and the TCO of Lync operations and support.

Integration with Microsoft’s SDN API gives Nectar’s UCD module a unique view into content, session and IP topology-level data throughout a Lync network.

UCD reports on each Lync endpoint without probes to provide network administrators with a unique comprehensive visibility into the Lync environment, including:

- Viewing Lync’s encrypted signaling and media traffic without compromising security
- Capturing session-level information throughout the Lync network
- Tracking calls throughout the network in real-time from start to finish
- Delivering real-time analytics on the signaling and media throughout the life of each call to calculate the actual quality of the call, something no other vendor can do

with post-call average-quality metrics

- Correlating the quality of the call with what is happening throughout the route taken by the call
- Isolating where the problem is actually occurring (data center, branch office, cloud, etc.) by peering with nearest router and correlating the information across the network; probes need to poll each endpoint
- Bracketing issues throughout the network more cost-effectively, providing a minimal footprint to deliver the most in-depth visibility
- Tying the problem back to the root-cause through real-time content, session and topology correlation

UCD’s tight integration with Microsoft’s SDN API enables UCD to facilitate Microsoft Lync event root-cause analysis, identification and resolution in just a few clicks, minimizing the manual efforts of IT operations and support personnel.

UCD produces a Quality of Session Record (QSR) for each call, which is a real-time correlation of the Lync session, content and IP topology information. The QSR reports can be generated via the UCD graphic user interface (GUI) and identify the root-cause and allow you to take appropriate action to remediate the service-affecting issue.

- Multi-dimensional, auto-correlated record
- Insight into customer experience
- Isolates root cause of alerts and problems
- Dramatically reduces MTTI / MTTR
Reducing Complexity in Managing the Lync and Hybrid UC Network

UCD provides a comprehensive, well-organized, single pane of glass web-based GUI and workflow structure that allows a much greater percentage of UC service cases to be quickly managed at help desks without requiring expert resources. Ample forensic data is supplied if escalation to higher skill-set agents is required. UCD also supports manager-of-manager applications such as Microsoft System Center — delivering KPI threshold-crossing alerts and other service-related data to unified management solutions.

Accurate Forensics and Correlation

UCD's forensic data is derived from all calls — including those affected by service disruptions. After the fact, hunt-and-peck trace enabling and analysis are not required, nor are costly probes at every endpoint. UCD's tight integration with Microsoft Lync SDN API provides real-time, hop-by-hop path identification across Microsoft Lync as well as heterogeneous UC and network environments, eliminating other network elements from the hunt for the root cause.

Quicker Root Cause Analysis and Time to Resolution

UCD's deep visibility and correlation of UC session, content and IP topology layers yield up to a 70% reduction in mean time to repair (MTTR) UC service degradations and reduces false diagnoses. UCD QSRs help IT managers understand how severely the voice call was impacted at a particular hop and provide the correlated detail behind the congestion, facilitating the identification of the root cause and reducing the problem resolution time. UCD provides complete end-to-end visibility and root-cause identification from the data center out to the farthest edges of the network. UCD enables IT managers to perform “site grouping” to segregate calls from remote sites and accurately isolate faults for fast remediation in highly distributed enterprise networks.

Trend Analysis and Reporting

UCD historical reports and key performance indicators (KPIs) identify mid- and long-term trends for predicting capacity and performance actions, enabling administrators to anticipate caseload peaks and take action through proactive alerting. UCD provides IT managers over 50 different KPIs — half of which can be set for specific thresholds (e.g., MOS Factor, Packet Loss, Jitter, One-Way Audio, Signal Noise Ratio and Call Attempt Counter). UCD also features over 35 standard reports along with the ability to customize reports and graphs that quantify...
the overall health of the network. Executive summaries of the reports can then be customized to highlight key metrics and attributes. The enhanced visibility afforded by UCD provides both a reduction in TCO and a greater predictability for managing Microsoft Lync operations and meeting service level agreements.

The Nectar UCD and Microsoft Lync Demonstration

The following demonstration illustrates some of the ways that Nectar's UCD can be used to monitor and troubleshoot a Microsoft Lync deployment. The topology map in Figure 6 shows the network that is being monitored by Nectar's UCD. In order for the corporate office to call the branch office, the traffic must pass through the five routers in three locations: the corporate data center (C1, C2, CE1), an MPLS network (CE2) and a router at the remote branch site (R1).

This comprehensive insight into the network traffic is provided by UCD without using probes at each of the endpoints. Nectar's UCD SVP monitors the routers to provide a hop-by-hop view of the complete network path for each call and to detect network events in real time. The Microsoft Lync front-end server sends the session information for the Lync endpoints to the UCD SVP when the call starts and terminates. UCD also monitors session quality as it passes through the network. In this demonstration, we are analyzing traffic as it passes through the two routers (CE1 and R1) on the edges of the corporate network and tracking a network event along that path.

Topology of Lync Environment
A female user (User 1) in the corporate office calls a male user (User 4) in the remote branch site. The audio of a phone call is breaking up and the female user cannot be understood.

The voice call was impacted by the network link going down between CE1 and C2 and there was a moment of silence while the traffic was rerouted from CE1 to C1.

As the network rerouting occurs, both a “path down” and “priority queue alert” appears on the UCD dashboard.

By clicking on the alert and performing a session query, you’ll find information on all sessions that were going through the link while it was impacted or congested.
If you sort on the network loss column, you’ll find the session with the greatest packet loss was between User 1 and User 4.

To see detailed call information, open the quality of session record, or QSR, for this session. The top section of the QSR contains basic session information such as the time the call was established and terminated. It also flags that the audio stream experienced a path change and went through a congested interface.

The content statistics section of the QSR reports session quality information for both the source-to-destination and destination-to-source real-time transport protocol (RTP) streams. Each section contains two columns; the first from the Nectar UCD monitoring point and the second from endpoint information provided by Microsoft Lync API. The first UCD monitoring point reported poor quality for this session, while the second UCD monitoring point reported good session quality. The destination Lync endpoint also reported significantly reduced mean opinion score (MOS) and significant network packet loss — approximately 30%. It is UCD’s full support of the Microsoft Lync Software Defined Network (SDN) API that provides this detailed level of information on the Lync endpoints.

The IP topology section of the QSR shows the network path the RTP stream took through the network. In this case, there were two paths because of the network reroute. The upper section shows the hops prior to the link going down, and the lower section shows the hops taken after the link went down. You can see that this interface went down, causing a network reroute. The reroute caused additional network congestion on the interface highlighted here, resulting in a priority queue alert.

You can see the impact of this by clicking on the QSR query button. It returns two graphs; the first is packet...
drop. You can see from the legend that there is Lync-level information as well as information for five classes. While the call was active, there was significant packet loss out of the Lync class.

**Application QoS Settings & Packet Loss**

The second graph is bandwidth, which shows both the configured bandwidth for each queue and amount of traffic that was classified into that queue. The Lync class was provisioned for 5%, but more than 7% was attempting to get through. This caused the network packet loss and points to a QoS configuration issue.

This demonstration illustrates that it is UCD's comprehensive view and automatic correlation of the IP network content, session and topology layers, in addition to its access to Microsoft Lync session information that provides fast root-cause identification, analysis and remediation in just a matter of clicks.

**Application Bandwidth Settings & Utilization**

This scenario highlights just one use case or example of the capability UCD provides in combination with the Microsoft Lync SDN API. Not only does this technology afford operations manager and NOCs real-time notification of network events impacting Lync users, but also provide historical data in the event you need to analyze all the calls for a specific user for the last month or all sessions in and out of a specific location.

UCD provides all of this and more including key trending and reporting data that allows operations teams to be proactive and take necessary steps to address a potential issue before it becomes a major problem.
Nectar: Because Correlation Matters

Nectar’s UCD automatically provides a complete view of the content, session and network quality for each Lync session (voice & video) on a hop-by-hop basis. UCD’s unique ability to peer with the routed network provides immediate end-to-end visibility into Lync network events and issues. UCD with the new Lync SDN API uniquely enables network deployment and complete monitoring without costly probes.

UCD enables an end-to-end superior user experience by optimizing Microsoft Lync UC service management with:

- Immediate insight into network issues that affect Microsoft Lync performance
- Session-level integration with Microsoft Lync for real-time visibility without costly probes
- Automatic correlation of all IP network session, content and topology data with the user experience to see the “whole” Microsoft Lync end-user experience picture
- Accurate root cause analysis to find the “needle in the haystack” in just a few clicks
- Real-time and historic trending and reporting for greater predictability
- More than 70% reduction in problem resolution for a lower TCO

UCD as part of Nectar’s broad Converged Management Platform provides an entire picture and visibility into the Microsoft Lync ecosystem, including Lync servers, Lync QoE database, voice gateways and SBCs, other UC environments at the Lync edge, the routed network architecture, and soon Wi-Fi performance as well. This unique and complete view truly empowers service providers, system integrators, and enterprise customers to effectively manage their entire Lync UC environment and take full advantage of the benefits Microsoft Lync has to offer.


For more information visit www.nectarcorp.com.