

Open Interoperability Test Report

InnovaPhone

TEST RESULT:**PASS****DATE TESTED:****October 19th, 2011****PRODUCT/VERSION:****IP 3010 / 9.00 dvl IP3010[90773], Bootcode[90773],
Hardware[600]**

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DOCUMENT REVISION HISTORY

Version	Reason for Change	Date	Created/Updated by
1.0	Initial Draft	01/10/2008	Abelardo G.
1.1	Updated based on OCS Lync 2010 release	11/03/2020	Gerry Pearson
1.2	Test Results	10/24/2011	Gerry Pearson
1.3	Added comments regarding CN and REFER support to executive summary	11/7/2011	Gerry Pearson

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1 Executive Summary

The following summarizes tekVizion's findings:

Test Case Failures

- There were no test case failures.

Features Not Supported

- The PBX does not supply an FQDN in the SDP connection information (c=) field – IP address only.
- Attended transfer functions correctly only when REFER is disabled in Lync.
- The PBX supports negotiation of Comfort Noise, but does not generate CN packets itself.
- The PBX does not support REFER for call transfers. The following settings are required on the SIP trunk to the PBX:

```
Set-CSTrunkConfiguration -EnableReferSupport $false
Set-CSTrunkConfiguration -RTCPActiveCalls $false
Set-CSTrunkConfiguration -RTCPCallsOnHold $false
Set-CSTrunkConfiguration -EnableSessionTimer $true
```

Test Cases that were Not Executed

- 63515 (Multiple M-lines in SDP offer) – scenario cannot be reproduced with Lync.
- 63416 (Inbound calls with early media on PBX) – test case cannot be executed as written without the tool. However, PBX does support early media ringback when simlring or forward to an endpoint that provides early media RBT.
- 63488 (Delayed messages from MCS) – scenario cannot be reproduced with Lync.

Other Observations

- Because of dial plan requirements this test was executed entirely end-to-end; LyncIT does not support the necessary dial plan.

2 Introduction

Microsoft® Unified Communications Open Interoperability Testing is performed between Microsoft® Lync Server 2010 and InnovaPhone IP 3010. This document is a record of the test results, observations, and the overall testing experience with the device under test (DUT). The configuration of the device under test is also documented where required to make the systems interoperable.

2.1 Document Scope

This document provides the test report and approach used by tekVizion Labs to perform Microsoft® Lync Open Interoperability testing for the documented products and their versions. This document does not provide the test cases, the success criteria, processes and execution steps of testing that was performed. Refer to the Microsoft® connect.microsoft.com site for the Microsoft® documentation and test plan details.

2.2 tekVizion Labs

tekVizion Labs™ is an independent testing and Verification facility offered by tekVizion PVS, Inc. ("tekVizion"). tekVizion Labs offers several types of testing services including:

- Remote Testing – provides secure, remote access to certain products in tekVizion Labs for pre-Verification and ad hoc testing
- Verification Testing – Verification of interoperability performed on-site at tekVizion Labs between two products or in a multi-vendor configuration ("solution Verification")
- Product Assessment – independent assessment and verification of product functionality, interface usability, assessment of differentiating features as well as suggestions for added functionality, stress and performance testing, etc.

tekVizion is a systems integrator specifically dedicated to the telecommunications industry. Our core services include consulting/solution design, interoperability/Verification testing, integration, custom software development and solution support services. Our services help service providers achieve a smooth transition to packet-voice networks, speeding delivery of integrated services. While we have expertise covering a wide range of technologies, we have extensive experience surrounding our FastForward>> practice areas which include: IN Evolution, Packet Voice, Service Delivery, and Integrated Services.

The tekVizion team brings together experience from the leading service providers and vendors in telecom. Our unique expertise includes legacy switching services and platforms, and unparalleled product knowledge, interoperability and integration experience on a vast array of VoIP and other next-generation products. We rely on this combined experience to do what we do best: help our clients advance the rollout of services that excite customers and result in new revenues for the bottom line. tekVizion leverages this real-world, multi-vendor integration and test experience and proven processes to offer services to vendors, network operators, enhanced service providers, large enterprises and other

professional services firms. tekVizion's headquarters, along with a state-of-the-art test lab and Executive Briefing Center, is located in the Telecom Corridor® in Richardson, Texas.

(For more information on tekVizion and its practice areas, please visit tekVizion Labs's web site at www.tekVizionlabs.com.)

3 Testing Process and Criteria

3.1 Test Approach

End-to-End testing methodology is used for Microsoft® Unified Open Interoperability Verification testing. The testing approach is to test the functional interoperability between the products under test simulating a real-world setup. The testing focused on all interaction between the Mediation server of Lync 2010 and the partner device or network referred to as Device Under Test (DUT). No validation for Exchange Unified Messaging is verified. Microsoft® provided their Open Interoperability test tool (lynclT) to simulate the OCS and its clients to perform the automated tests and the remaining manual tests are executed using a real deployment of Lync 2010. The PSTN network was simulated in the tekVizion lab and for certain test cases, Tektronix Spectra2 was used to simulate the PSTN network. The version of the tool and the other test equipment used is documented in the next few section.

3.2 Entry Criteria

Before Microsoft® Lync 2010 Open Interoperability testing can begin, the partner has to download the test plan from the connect.microsoft.com site, execute the test cases in their lab and submit the results to tekVizion. TekVizion and Microsoft verify the submitted results for any exempt scenarios. Once the test results have been reviewed, partner can work with the tekVizion engineers to setup the partner equipment or network for testing. Partner engineer has the opportunity to verify the configuration of the DUT in the test network. Once interoperability testing has been initiated, the products under test are considered frozen for interoperability testing purposes. No software/firmware load will change during the testing period.

3.3 Acronyms

The key terms (acronyms) used in this test strategy are listed below.

BVT	Basic Verification Test
B3R	Beta 3 Refresh
B2BUA	Back to Back User Agent
DUT	Device Under Test
GW	Gateway
LC	Live Communications
OCS	Office Communications Server
SIP	Session Initiation Protocol
SDP	Session Description Protocol
ICE	Interactive Connectivity Establishment
QoS	Quality of Service
PBX	Private Branch Exchange
SBC	Session Border Controller
SP	Service Provider
UA	User Agent
UAC	User Agent Client
UAS	User Agent Server

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UC-OIP	Unified Communications Open Interoperability Program
OITT	Open Interoperability Test Tool
UC	Unified Communications
VoIP	Voice over Internet Protocol

4 UC-OIT Test Configuration

For this test, the IP PBX was provisioned with an E1 connection to a Cisco 3845 router that acted as a PSTN gateway. The protocol was set to QSig. Four IP phones were provided for the test, although only one was required for most test cases. Two mediation pools were created with one mediation server in each pool. The IP PBX configurations were modified during testing to match the requirements of each test case.

4.1 Test Network Setup

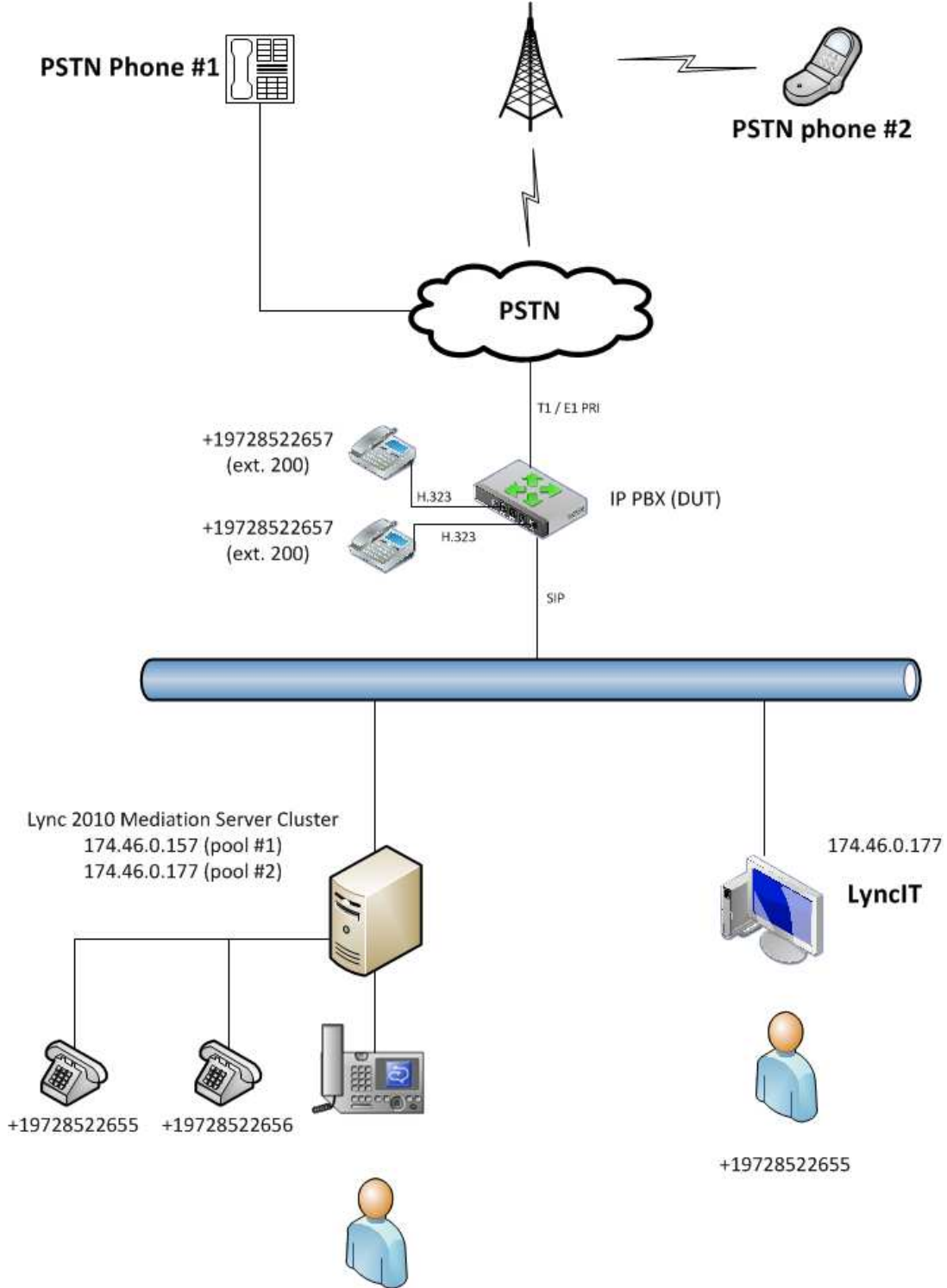


Figure 1 Microsoft® Lync Open Interoperability Test network.

4.2 Device Under Test

Devices Under Test	Version
InnovaPhone IP3010 (IP PBX)	9.00 dvl IP3010[90773], Bootcode[90773], Hardware[600]
InnovaPhone IP110 (IP phone – 4 ea.)	9.00 dvl IP110[90773], Bootcode[90773], Hardware[110]
Microsoft Lync 2010	4.0.7577.0
Microsoft Lync Interoperability Tool (LyncIT)	4.0.7577.4

4.3 3rd Party Components

List the 3rd party products/Components used to complete the testing.

3 rd Party Product/Components	Version

4.4 Administration and Debugging Tools

List the tools utilized during the execution of the test cases in this document.

Administration and Debugging Tools	Version
WireShark	Version 1.4.2 (SVN Rev 34959 from /trunk-1.4)

4.5 Test Equipment and Number Assignment

Test Equipment	Description	Number Assigned
Lync subscriber	Lync client	+19728522655
Lync subscriber	Lync client	+19728522656
IP 110	InnovaPhone IP	+19728522657

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	phone	(local ext. 200)
IP 110	InnovaPhone IP phone	+19728522658 (local ext. 201)
IP 110	InnovaPhone IP phone	local ext. 202
IP 110	InnovaPhone IP phone	local ext. 203

5 Interoperability Test Results

5.1 Rules of Engagement for Testing

- The test steps and the expected results are defined in the test plan and not in this report. If any changes or deviations are needed they have to be documented in the report.
- If any test case is not applicable then it should be marked as "N/A" and an explanation should be provided for marking it N/A
- In the comments section the file reference where the logs are captured should be documented
- The test result should be marked as "Pass", "Fail", "N/A", "N/S" for Not Applicable" and "Not Supported" only
- All test cases should have a result defined.
- If a test case has a "N/A" or a "N/S", the reason for this result should be documented
- If a test case is marked "Fail", change the color to "Red" for easy reading

Number	Description	LyncIT ID	Required	Result	Comments
AUDIO TEST CASES					
63520	Comfort noise Verification	83717	Yes	E2E: Pass	E2E: CN negotiated. PBX receives CN packets but does not generate.
63518	Make an Outbound call from Lync user to verify RTCP packets	83724	Yes	E2E: Pass	
63403	PBX Configured with G711 Codecs	83755	Yes	E2E: Pass	
63519	Verify RTCP packets on Hold Call	Not automated	Yes	E2E: Pass	
BASIC CALL SCENARIO TEST CASES					
63480	Anonymous (no user information) user calls Lync user	83754	Yes	E2E: Pass	
63394	Caller ID Verification on both sides	83781	Yes	E2E: Pass	
63388	Inbound: Call disconnect from PBX User	83787	Yes	E2E: Pass	
63483	Inbound: Decline call from Lync user	83793	Yes	E2E: Pass	
63401	Inbound: Lync user is Busy and decline the call	83793	Yes	E2E: Pass	
63387	Inbound: PBX user calls Lync user and later Lync user hangs up	Not automated	Yes	E2E: Pass	

63402	Inbound: Simulring back to PBX user	Not automated	Yes	E2E: Pass	
131959	Inbound: Disconnect Calls before Connect	83792	Yes	E2E: Pass	
63382	Inbound to Lync user - Verify Ring back and Audio	Not automated	Yes	E2E: Pass	
132291	Inbound: Verify SSRC packets	83773	Yes	E2E: Pass	
63485	Lync user makes a call to a PBX user and the PBX doesnt have a T-1 line connected	83768	Yes	E2E: Pass	
63482	Lync user reach PBX with invalid user number	83841	Yes	E2E: Pass	
63396	Outbound call: Verify 486 Busy message	83868	Yes	E2E: Pass	
63383	Outbound call to PSTN user	83762	Yes	E2E: Pass	
63391	Outbound Call: Lync user hangs up	83757	Yes	E2E: Pass	
63392	Outbound Call: PBX user hangs up	Not automated	Yes	E2E: Pass	
63390	Outbound: Decline message from PBX side	Not automated	Yes	E2E: Pass	E2E: PBX returns 486 Busy Here
63393	Outbound: Disconnect before Connect	83791	Yes	E2E: Pass	
63389	Outbound: Lync user dial PBX user	83790	Yes	E2E: Pass	
131993	Outbound: Verify SSRC packets	83774	Yes	E2E: Pass	
63481	PBX user reach MCS with invalid user number	Not automated	Yes	E2E: Pass	
63384	Verify Fast Busy Tone on PSTN side	83868	Yes	E2E: Pass	
63515	Verify Multiple M-lines in SDP offer	Not automated	Yes	E2E: N/T	E2E: Test scenario cannot be executed with Lync
CONFERENCE TEST CASES					
63407	Conference with PBX user	Not automated	Yes	E2E: Pass	
63409	Lync user hold call from Conference	Not automated	Yes	E2E: Pass	
63410	PBX user mark call Hold in Conference	Not automated	Yes	E2E: Pass	
63408	PBX user Sign off from Conference	Not automated	Yes	E2E: Pass	
FAILOVER TEST CASES					
63442	DNS Load Balacing: Verfiy FQDN details	Not automated	Optional	E2E: N/S	
63449	IP PBX handles situation where MS leaves Drianing Mode and becomes Online	Not automated	Optional	E2E: Pass	
63460	IP PBX handles unplanned outage: 2 cluster with each 2 Mediation server	Not automated	Optional	E2E: Pass	

63457	IP PBX handles unplanned outage: One cluster with 2 Mediation server	Not automated	Optional	E2E: Pass	
63458	IP PBX handles unplanned outage: One cluster with 2 Mediation server - after timeout	Not automated	Optional	E2E: Pass	
63459	IP PBX handles unplanned outage on Mediation server#1 and #2.	Not automated	Optional	E2E: Pass	
63456	IP-PBX accepts connections from any Mediation server in the cluster listed as trusted	Not automated	Optional	E2E: Pass	
63444	IP-PBX handles 2 Mediation servers in the cluster (3 simultaneous calls scenario)	Not automated	Optional	E2E: Pass	
63445	IP-PBX handles multi inbound connections during basic call	Not automated	Optional	E2E: Pass	
63447	IP-PBX handles multi inbound TLS connections during call conference	Not automated	Optional	E2E: Pass	
63446	IP-PBX handles multi outbound TLS connections during basic call	Not automated	Optional	E2E: Pass	
63448	IP-PBX handles the new call when Mediation server enters draining mode(planned outage)	Not automated	Optional	E2E: Pass	
63450	IP-PBX handles the new calls when more than one Mediation server enter draining mode (planned outage for 2 servers)	Not automated	Optional	E2E: Pass	
DTMF TEST CASES					
63414	Call from PBX/PSTN phone to Conference Auto Attended (CAA)	Not automated	Yes	E2E: Pass	
63413	Make an Outbound call from OC to PBX user	Not automated	Yes	E2E: Pass	
63411	Outbound call: PBX voicemail system	Not automated	Yes	E2E: Pass	
63412	Outbound call: PSTN IVR number	83932	Yes	E2E: Pass	
EARLY MEDIA TEST CASES					
63416	Inbound Calls with Early Media turned on PBX	83960	Yes	E2E: N/T	E2E: Test scenario cannot be executed with Lync
63417	OC Calls Early IVR and sends DTMF tones to navigate the menu	Not automated	Yes	E2E: Pass	
63415	Outbound Calls with Early Media turned on PBX	100317	Yes	E2E: Pass	
	Outbound Calls with Early Media turned on PBX	83845	Yes	E2E: Pass	
63418	PBX user Calls OC client with call-forwarding set to an Early media IVR	83947	Yes	E2E: Pass	

63419	Simulring: To number which supports EarlyMedia	Not automated	Yes	E2E: Pass	
63489	Verify Alert and Progress message from IP PBX system	83856	Yes	E2E: Pass	
63488	Verify IP PBX handles delayed messages from MCS	83936	Yes	E2E: N/T	E2E: Test scenario cannot be executed with Lync
HAIRPIN TEST CASES					
63420	OC Client forwards the inbound call to another PSTN phone	83965	Yes	E2E: Pass	
63421	OC Client transfer the inbound call to another PSTN phone after answering - REFER is disabled	83966	Yes	E2E: Pass	
63422	OC Client transfers the inbound call to another PSTN phone after answering it when REFER is enabled	Not automated	Yes	E2E: Pass	
HOLD TEST CASES					
63432	Inbound call - Hold for 2 minutes with AA	Not automated	Yes	E2E: Pass	
63423	Inbound call - Lync user does Hold /Unhold	84019	Yes	E2E: Pass	
63425	Inbound call - PBX user hangs up while call on hold	84023	Yes	E2E: Pass	
63424	Inbound call - UC endpoint hangs up while on hold	84021	Yes	E2E: Pass	
63431	Inbound Call: PBX user does Hold/Unhold	Not automated	Yes	E2E: Pass	
132250	Inbound: Hold/Unhold for 12 minutes.	97602	Optional	E2E: Pass	
63426	Outbound Call: Lync user does Hold/Unhold	Not automated	Yes	E2E: Pass	
63429	Outbound Call: Lync user does Hold/Unhold for more than 12 minutes.	84015	Yes	E2E: Pass	
63427	Outbound Call: Lync user does Hold/Unhold more than 30 seconds.	Not automated	Yes	E2E: Pass	
63430	Outbound Call: PBX user does Hold/Unhold	Not automated	Yes	E2E: Pass	
ISDN TEST CASES					
63536	Lync user calls a PSTN user who is busy.	83788	Yes	E2E: Pass	
63537	PSTN users an INVITE to the Lync Server 2010, and it does not respond to the INVITE causing the PBX to time-out	Not automated	Yes	E2E: Pass	
63535	Verify 404 Message from PSTN	Not automated	Yes	E2E: Pass	E2E: In-band telco announcement
MEDIA BYPASS TEST CASES					
63462	Inbound call from PBX user to OC Client with by-pass enabled.	Not automated	Optional	E2E: Pass	

63461	Outbound call from OC Client to PBX phone	Not automated	Optional	E2E: Pass	
63464	Outbound Call: Attended transfer to another Client	Not automated	Optional	E2E: Pass	E2E: Transfer fails with REFER enabled. Transfer succeeds with REFER disabled
63463	Outbound Call: Blind transfer to another Client	Not automated	Optional	E2E: Pass	
63465	Outbound call: CFA to another client	Not automated	Optional	E2E: Pass	
63467	Outbound call: CFB to another Lync user	Not automated	Optional	E2E: Pass	
OPTIONS TEST CASES					
63475	Verify Options interval from IP PBX	Not automated	Optional	E2E: N/S	E2E: PBX does not send OPTIONS
63476	Verify Options interval from MS	84065	Optional	E2E: Pass	
63477	Verify Options Pending from MS	Not automated	Optional	E2E: N/S	E2E: PBX does not send OPTIONS
REFER TEST CASES					
63469	Inbound Call: Attended Transfer to PBX user	Not automated	Optional	E2E: N/S	E2E: Transfer fails with REFER enabled
63468	Inbound Call: Blind Transfer to PBX user	Not automated	Optional	E2E: Pass	
63471	Outbound Call: Attended Transfer to PBX user	Not automated	Optional	E2E: Pass	
63470	Outbound Call: Blind Transfer to PBX user	Not automated	Optional	E2E: Pass	
63472	Verify Incoming Refer message from IP PBX	Not automated	Optional	E2E: Pass	E2E: PBX does not send REFER
63474	Verify Lync user terminates call while on transfer	Not automated	Optional	E2E: Pass	
63473	Verify transfer timeout with IP PBX System	Not automated	Optional	E2E: N/S	
SECURITY TEST CASES					
63433	Inbound Call: PBX user calls Lync user	Not automated	Optional	E2E: Pass	
63435	Outbound Call: Lync user calls PBX user	Not automated	Optional	E2E: Pass	

6 References

The test strategy and the test cases for the interoperability testing are not attempting to check the complete conformance of these references, but are used as a guide in designing the test cases.

- "Microsoft Enhanced Gateway Test Plan"; Microsoft; <http://connect.microsoft.com>
- "Telephony Partner Product Interoperability Specification – Enhanced Gateway specification for Connection to Lync Server 2010, Mediation Server"; Microsoft; <http://connect.microsoft.com>
- "Microsoft Lync Server 2010, Partner Gateway Audio Quality Specification"; Microsoft; <http://connect.microsoft.com>