Level 1 Technical
Microsoft Lync Basics

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1 – Glossary

- **Conferencing Solutions** – voice devices designed for use in large or specialized voice environments, meeting rooms or for hands-free use
- **Desktop Solutions** – voice devices designed for personal and desktop use
- **Digital telephony** – telephony using Integrated Services Digital Network (ISDN) and a PBX or PABX
- **Gateway** – a device that acts as an interface between otherwise incompatible technologies, such as H.323 and SIP
- **H.323** – a protocol used in voice and video that defines protocols for call control and audio, video and data processing
- **Polycom UC Software** – Polycom software utilized by conferencing and desktop solutions
- **Private Automatic Branch Exchange (PABX)** – a private telephony service which does not require a switchboard
- **Public Switched Telephone Network (PSTN)** – telephony using the original telephone network, otherwise known as analog telephony
- **SIP** – a protocol used in voice and video calls that is designed to work with other existing call audio, video and data processing protocols rather than defining them
- **Unified Communications (UC)** – the integration of real-time communication services such as instant messaging, presence information, telephony, video conferencing, and data sharing, with non-real-time communication services such as voicemail and e-mail.
- **Voice over IP (VoIP)** – telephony using an IP network, otherwise known as IP telephony
2 – Introduction

Microsoft Lync is a unified communications (UC) system that enables you to perform many communications-based tasks from a computer, mobile or telephony device that is designed to work with Lync.

There are Microsoft Lync clients available for desktop operating systems, and Microsoft Lync apps available for phone and tablet devices, including iOS, Android and Windows Phone. The feature set supported by these apps varies, but all include the ability to make voice and video calls.

From the Lync client, you can send instant messages, and make voice and video calls with one or more participants. All standard basic PABX functions such as call forwarding, voicemail, hold and transfer are available from within the Lync client.

Through the Instant Messaging (IM) feature, you can also send files, and share your whole desktop or an individual application with other participants. You can also give control of your desktop to another user, which can be extremely helpful for IT staff attempting to troubleshoot issues remotely.

You can use the Lync client to specify Location information to display whether you are at work, at home, on the road or anything else you choose. You can also have your Lync client display a status message, providing more information about what you are doing right at that moment.

In addition to Instant Messaging, Lync includes the Persistent Chat feature, which is a conversation between two or more participants that is retained over time. You can enter, leave and return to a Persistent Chat as and when you wish.

With Lync you can create and participate in meetings in different ways. Ad-hoc meetings can be initiated straight from the Lync client or device, simply by adding another user to the call. Alternatively, you can schedule meetings in advance, with Microsoft Exchange providing the necessary scheduling information to help you ensure that everyone is available at the same time before scheduling the meeting. Once created, the meeting is listed in your calendar in Outlook – you can join the meeting by clicking the appropriate link in Outlook. Users from outside the organization can join these scheduled meetings too – they are supplied with a URL to access the meeting.

Once in a meeting, the Lync client enables you to perform the same types of task that you could perform in a one-on-one conversation; you can use voice or video for the meeting, share files, and send IMs to the group or to individual participants. You can share your desktop or an individual application, and even give control to another attendee. There are also options for muting attendees when background noise becomes an issue, and setting up a Q&A chat window which enables attendees to ask a question without interrupting the flow of the meeting.
3 – Integration

Lync integrates closely into a number of Microsoft Office products including Word, Excel, Outlook, and OneNote. Because the entire Lync solution is designed to be integrated with other essential systems, this has the benefit of allowing multiple methods of response to a communication. Receive an email and want to call the sender? Click the button and call them. Want a quick clarification to an email? Click the button and send an IM. Want to call someone but not sure if they are in a meeting or out of the office? Check their presence from the global address book or Lync client.

In order to achieve this, Lync works with Microsoft server products such as Active Directory (which provides a central repository for all users on a network to log in and authenticate to the corporate network), Exchange (which provides email, calendar and directory services to users with Microsoft Outlook installed) and SharePoint (which provides a web platform commonly seen in the form of intranet services) to provide a more fully integrated and broader solution that makes the full capabilities of a unified communications (UC) environment available.

Integration with Microsoft Office is one of the most compelling features of Lync. It makes Lync easy to use, and offers options only available by drawing on different components of Office. For example, a user’s presence information is available throughout Office applications when Lync is integrated with Exchange; presence information is displayed in Lync, Outlook, and SharePoint, and the user’s contact card will usually be available for ease of access. Benefits of integration with Office include:

- Active Directory provides user authentication and Single Sign-On (SSO) capabilities, so that users only have to log on once
- A user’s contact list can be automatically populated from Exchange
- Scheduling information can be retrieved from Exchange when scheduling a meeting between multiple users
- Presence information is displayed throughout Office
- Microsoft Word, Microsoft PowerPoint and Microsoft Excel include an option to send the active file by IM
- Word, PowerPoint and Excel provide the option to see the presence status of other users relevant to the file (for example, listed as an author or reviewer)
- SharePoint ‘My Site’ profile pages which allow users to search for people with specific skills or expertise

A Lync deployment is most commonly accessed using the Microsoft Lync client installed on your computer, which remains running when not in use. Because the Lync client updates presence information in real time it can do things like set your status to Away when you lock your desktop, refuse to receive an instant message (IM) if your status is set to Do Not Disturb, and change your status to In A Call as soon as you dial.

The voice element of this integration is provided by a function called Enterprise Voice, which essentially is a VoIP service used to replace the traditional PABX. This integrates into both analog and digital telephony systems to allow users to call not only internally, but also externally to customers, partners, and anyone else with a telephone.

External VoIP connectivity is available (in addition to instant messaging, presence and so on) by implementing a process called federation. This is achieved by having the Lync administrators at each company allow access from their domain to the domain of the other so that it is a recognized destination, and, as you can imagine, greatly increases the reach (and usefulness!) of the solution. Each domain connected in this way is said to be federated with the other.
All standard basic PABX functions such as call forwarding, voicemail, hold and transfer are available, and when using the Lync client on the desktop additional helpful functionality becomes available, such as finding the contact in your address book and clicking the number to dial rather than reading off the screen while you press the buttons to dial on your phone.

Where an actual handset or device is required, for example where a switchboard is required or a conference room needs audio collaboration, this is where Lync Optimized and Lync Qualified devices come into play (further information on these devices can be found in the Start Here courses Introduction to Polycom Voice, Positioning Conference Voice and Positioning Desktop Voice):

**Optimized for Lync**

These phones use the Lync Phone Edition software as their operating system and are designed from the ground up for Lync. The phones come in different models designed to meet specific business needs such as desk phones, common area phones, or conference room phones.

**Compatible IP Phones Tested and Qualified for Lync**

Compatible IP phones run a manufacturer designed operating system that can communicate directly with a Lync Server infrastructure without the need for a gateway. In Polycom’s case this is the UC Software (UCS) deployed on the VVX and SoundPoint phones. Devices are fully tested and qualified to provide direct connectivity, core call functionality, presence awareness, and centralized management and provisioning.

In addition to the devices being able to register and log into the Lync environment, all devices which are Microsoft Lync Qualified (such as the VVX 500 and 600) and have Ethernet ports support a feature named Better Together over Ethernet, or BToE. The phone connects to the network via its LAN port, and can be connected to a PC running the Microsoft Lync client via its PC port. This enables the Lync PC client to see the phone as an audio device so they can be used in tandem, and the phone receives all contacts, presence and dial plan details from the Lync PC client. The software can be downloaded from [www.polycom.com](http://www.polycom.com). This functionality is also available on some Lync Optimized devices.

When devices such as these are used, a call received through the Enterprise Voice system to John Smith will cause any devices logged in with John Smith’s credentials to alert an incoming call. So John can answer using a desktop Lync client, Lync Optimized handset, Lync Qualified handset, a mobile running the appropriate Lync client, and so on.

As a final point on this subject, it is important to note that Lync uses its own codecs for sending and receiving audio and video, namely RTA (Real-Time Audio) and RTV (Real-Time Video). So these Lync Qualified devices are able to support RTA (and RTV in a video-enabled device) as well as their native SIP and/or H.323. This is why gateways are required in an environment that cannot natively support the Microsoft codecs.
4 – Architecture

Lync Server Editions

Lync Server is available in two editions, enabling an organization to choose whichever is appropriate for their needs:

- **Lync Server Standard Edition** - enables many of the features of Lync, such as instant messaging, presence, conferencing, and Enterprise Voice, to run on one server for small implementations or for trial/testing purposes

- **Lync Server Enterprise Edition** - provides all the same features as Lync Server Standard Edition and adds scalability and high availability features

Lync Server Roles

Most functions of Lync Server Enterprise Edition require separate servers, and each of these functions is called a server role. An organization implements as many of these server roles as is necessary to provide the Lync functions required.

Server Pools

For high utilization and high availability, more than one server can run the same server role. This is known as a server pool. For most types of pools in Lync Server, a load balancer spreads traffic between the various servers in the pool. Load balancing can be achieved both by hardware that directs the network traffic appropriately (all connections go to the IP address of the load balancer), and also by utilizing DNS – multiple servers are all registered against the same DNS record (for example servers.domain.com) so that connections go to that DNS name. Lync supports both these methods of creating server pools.

Let's take a look now at what these server roles are in more detail.

Front End Server

This is the core server role for Lync, and it provides all the basic functionality required for a Lync implementation. The Front End server processes user authentication and registration requests, supplies presence information, supports instant messaging, and provides address book services. Front End servers also host different forms of conferencing, including web conferencing, PSTN dial-in conferencing, and audio visual conferencing.

Front End servers are key to providing Lync services, so it is important that they are always available. For this reason, organizations frequently deploy multiple Lync servers running the Front End role in a server pool providing reliability so that if one server fails, another can take over. Front End server pools also provide scalability, enabling the organization to expand the Lync deployment to support more users as the need arises.
**Back End Server**

The Back End server is a partner to the Front End server role, storing information about users, conferences and other Lync services in database form. Back End servers are database servers running Microsoft SQL Server; Back End servers do not run any Lync Server software.

**Edge Server**

Another important Lync server role is the Edge Server, which enables internal users to communicate with external users, effectively crossing the edge of the organization’s network. These external users might be outside users who have been invited to join conferences, users from federated partner organizations, or the organization’s own users who are currently working offsite. The Edge Server also enables connectivity to public IM services, such as Windows Live and Google Hangouts.

The Edge Server sits in the perimeter network, between the organization’s internal network and the internet; it has two network cards, one connected to the internal network, and one connected to the internet. To enable communication, the appropriate ports must be opened on the internal and external firewalls.

**Mediation Server**

The Mediation Server is necessary for organizations implementing Enterprise Voice and dial-in conferencing. The Mediation Server translates signaling data and media between an internal Lync Server and a PSTN gateway, PABX, or connectivity to a SIP service. The Mediation Server role can be run on the same server as a Front End server, or as a separate stand-alone Mediation Server pool.
Director
The Director has different roles for internal users and external users.

Internal users
In environments with a single Front End server pool, DNS records can be created to help the client find the Front End pool automatically. In a larger environment, however, there may be several Front End pools, but users are homed in only one of them. If this is the case, DNS records direct the user to a primary Front End pool, and if the user is not homed in that pool, the Front End server will redirect the user’s request to the pool where the user is homed. If a Director is implemented, all user requests go to the Director, which then redirects user requests to their home Front End pool. As the Director does not itself home any users, once the user has been redirected to their correct pool, it plays no further role in communications between the client and the Front End pool.

In this scenario, the Director is used to relieve some of the load from the primary Front End pool.
External Users

When users access the internal Lync deployment from the Internet, the Edge Server can be configured to pass user requests to the Director. The Director authenticates the users to make sure they have the necessary permission to access the Lync deployment, and then forwards the authenticated session (whether that be an instant message, audio or video call) to the Front End server pool. The Director remains active in the communication path while the session lasts.

The Director also provides another layer of security, preventing Denial of Service (DoS) attacks from affecting the internal Lync deployment.

Sites

Lync is deployed in sites that reflect the physical topology of the network. Sites aim to place Lync services close to the users, so that they are easily accessible. There are two types of sites: central sites and branch sites.
Central Sites

A central site is usually a large site such as a data center which has onsite IT staff. Each Central Site must contain at least one Front End pool or Standard Edition server. A Lync deployment must include at least one central site. A large deployment will also include many branch sites, a small deployment could have no branch sites at all.

A Lync deployment follows the organization’s server infrastructure, especially the locations of the data centers. For example, if the organization has three data centers for resiliency reasons, there should be three central sites.

Branch Office Sites

A branch office is a smaller location, which may or may not have onsite IT staff. Each branch site is affiliated with one specific central site, the servers in which provide the branch site users with access to Lync functionality.

Branch sites with less resilient WAN links can use a Survival Branch Appliance to provide resiliency if the WAN link fails. A Survival Branch Appliance combines a public switched telephone network (PSTN) gateway with limited Lync functionality. In a branch site with a Survival Branch Appliance, users can still send and receive Enterprise Voice calls, even if the WAN connecting the branch site to the central site is unavailable.

Branch sites with more resilient WAN can connect to the central site by using a PSTN gateway, and may use a Mediation Server.
5 – Voice Integration

One of the major benefits of Lync as a solution is its ability to be used as an IP PABX, enabling the customer to replace or upgrade their existing telephony solution to incorporate all the features mentioned so far. Between the use of the Lync client as a softphone and the addition of desktop and conference telephony devices, Lync can provide a ‘one stop shop’ to cover the communication needs of an enterprise.

Most organizations will have an existing PABX system that must be accounted for when deploying Lync. The role of the PABX in the new infrastructure must be defined, for the short term, and for the long term.

Connect to an existing PABX

Connecting the new Lync deployment to the existing PABX can be an attractive short term option; it means there is no need to make changes to the existing PSTN connection, and the users can keep their existing numbers. However, this may not be a good long term strategy, as the PABX must be retained, possibly at an additional cost, and there is additional PABX configuration required.
Connect directly to the PSTN

The alternative is to connect the new Lync deployment directly to the PSTN. This is a quick and easy approach that requires no additional PABX investments or configuration. The disadvantages of this approach include the need to issue new numbers for the users, and that internal calls between Lync and any legacy PABX system must use the PSTN. If there is sufficient traffic between Lync and the PABX, there may be a need for additional trunk capacity and a corresponding cost increase.
6 – Conclusion

This guide has provided an introduction to Microsoft Lync and how Polycom telephony devices enhance a Lync environment. This guide will help you to prepare for the relevant Level 1 Technical Assessments.

Available Resources

In addition to the information contained in this document, please also take a moment to familiarize yourself with the following resources available:


White papers - [http://www.polycom.com/products-services/resources.html](http://www.polycom.com/products-services/resources.html)


Polycom product documentation –


Microsoft Product documentation –
