



Arc Pro

Compatibility and Performance Guide

Version 6.3.0



Enghouse
Interactive

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Audience

This document describes hardware, operating system, client, virtualisation software environment requirements, UC system compatibility and guidelines for use of third party components as well as performance statistics and system sizing guidelines.

Contents

This document contains the following sections:

- [About this document](#) explains who should use this document, what is new in this release, and where to find additional resources and support. It also explains the conventions used in this document.
- [1: Compatibility](#) lists what Arc Pro is compatible with and which kinds of support are available.
- [2: System minimum requirements](#) lists the minimum requirements for the Arc Pro Server and the Arc Pro Client.
- [3: Supported handsets](#) lists all the available handsets and describes whether they are supported or not.
- [4: Performance and utilization](#) gives more detail about how to use Arc Pro.

Reference materials

This document should be read in conjunction with the information and procedures in the following documents or Help:

- *Arc Pro Compatibility Matrix* for the Cisco Unified Communications Manager supported by Arc software versions
- *Arc Pro Design Guide* for best practices and how to plan your deployment
- *Arc Pro Installation Guide* for the individual installation documents for your server component or client applications

- *Arc Pro Configuration Guide* for a comprehensive overview of the configuration of the server component
- *Arc Pro Provisioning Wizard Guide* for using the provisioning wizard to configure the Arc Pro software
- *Arc Pro CUCM Configuration Guide* for a description of the configuration requirements of Cisco Unified Communication Manager versions 9.x to 12.x.

Document conventions

This document uses the following text formats and notation conventions.

Text format

Bold text indicates a button, field, link, option name, or similar function requiring an action.

Italicized text indicates new terms, directory paths, or references to external documents.

Text in this font indicates code.

Notes and cautions

Icons used throughout this document identify additional details or special conditions.

Note

Provides additional information or describes special circumstances.

Caution

Warns of user actions that may cause system failure or irreversible conditions.

Stop

Describes actions that you should only perform under the supervision of Enghouse Customer Support.

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1: Compatibility

This chapter contains the following information:

- Cisco Unified Communications Manager compatibility
- VMWare and VMotion support
- Hyper-V support
- Remote Desktop connection and Terminal Services support
- SQL Server support
- Server and SQL regional settings
- Client OS compatibility
- Citrix support
- Technologies matrix

This section describes CUCM and OS compatibility in both hardware-based and virtual environments. The virtual environment is VMWare (ESX/ESXi).

CUCM	Server 2003 R1	Server 2003 R2	Server 2008 R1	Server 2008 R2	Server 2012	Server 2012 R2	Server 2016
			32-bit only	64-bit only	64-bit only	64-bit only	64-bit only
7.1(x)	N	N	N	N	N	N	N
8.0(x)	N	N	N	N	N	N	N
8.5(x)	N	N	N	N	N	N	N
8.6(x)	N	N	N	N	N	N	N
9.0(x)	N	N	N	N	N	N	N
9.1(x)	N	N	N	N	N	N	N
10.0(x)	N	N	N	N	N	N	N
10.5(x)	N	N	N	N	Y	Y	Y
11.0(x)	N	N	N	N	Y	Y	Y
11.5(x)	N	N	N	N	Y ⁽¹⁾	Y ⁽¹⁾	Y ⁽¹⁾
12.0(x)	N	N	N	N	Y	Y	Y

(1) CUCM 11.5.1 Support	Customers using CUCM 11.5(1) will hit issue CSCva87971 when configured devices are within a specific partition. To resolve this issue, partners or customers are advised to request a hot Cisco TSP fix from Cisco TAC against the above-mentioned CDET or upgrade CUCM to 11.5(1.13032-4 or above.
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Cisco Unified Communications Manager compatibility

Arc Pro version 6.3 is compatible with the Cisco Unified Communication Managers (CUCM) and the respective Cisco TAPI TSP shown in the Compatibility Matrix.

VMWare and VMotion support

Arc supports deployment in VMWare virtual server environments. Arc Pro is supported in a live environment on VMWare ESX and ESXi version 4.x to 6.5 only.

Arc supports VMotion when running in maintenance mode only - by definition VMware VMotion operates on live VMs, but the VM running Arc must be "live but quiescent" (in a maintenance window, not in production and not processing live traffic). This is because during the VMotion cutover, the system is paused, which creates Arc server service interruptions that degrade voice quality for calls in progress.

Moving the environment

If you need to move the environment, you must create a new unique identifier, as described here:
http://kb.vmware.com/selfservice/microsites/search.do?language=en_US&cmd=displayKC&externalId=1541.

Hyper-V support

Arc Pro is not supported in a live environment on the HyperV platform.

Remote Desktop connection and Terminal Services support

The Arc Server is not supported in Remote Desktop (RDP) and Terminal Services (TS) environments, as these can cause problems with the required Wave Driver operation. This is an issue common to all Wave Driver applications and not due to Arc software design.

SQL Server support

SQL	Server 2008 R2 64-bit only	Server 2012 64-bit only	Server 2012 R2 64-bit only	Server 2016 64-bit only
2005 32-bit	N	N	N	N
2008 32-bit	N	N	N	N
2008 64-bit	N	N	N	N
2008 R2 32-bit	N	N	N	N
2008 R2 64-bit	N	N	N	N
2012 (32-bit and 64-bit)	N	Y	Y	Y
2014 (32-bit and 64-bit)	N	Y	Y	Y
2016 (32-bit and 64-bit)	N	Y	Y	Y

SQL Express support

The SQL Server Express product versions listed in the SQL Server Support table are supported with Arc Pro, however they have performance limitations.

In sites where one or more of the following are expected Arc recommends you consider using SQL Server Standard or Enterprise:

- More than 10 operators or agents
- More than 500 calls per user per day

- More than 10,000 contacts in the directory

When a system outgrows a SQL Express deployment, or if you are experiencing issues with SQL Express, you can upgrade to SQL Standard or Enterprise with minimal effort. Consult your Microsoft representative if you are looking to license managed or hosted solutions.

Server and SQL regional settings

Arc does not specifically require an English deployment of Microsoft Windows Server unless support for Stemming is required within the Arc database. Stemming is only supported in the following locales

Language (Locale)	LCID Decimal	LCID Hex	Codepage	Country code (3 digit)	Country code (2 digit)
German (Germany)	1031	0407	1252	DEU	de-de
German (Austria)	3079	0c07	1252	AUT	de-at
German (Liechtenstein)	5127	1407	1252	LIE	de-li

If you are deploying in one of these locales, you can take advantage of Stemming support with your Microsoft SQL Server deployment. Stemming is not supported in the English locale.

Upon installation of Arc Pro, the regional settings of the server will be checked and if a stemming algorithm exists for a locale (as shown in the table above), then the stemming algorithm will be used.

For English language deployments, stemming is not supported and the default Microsoft SQL collation deployed is Latin1_General_CI_AS

For more information on the concept of Stemming, refer to <https://en.wikipedia.org/wiki/Stemming>.

Client regional settings

All Arc Pro clients are available only in English except for the Arc Pro Attendant Console, which is available in the following languages:

English, French, Italian, German, Spanish, Portuguese, Arabic, Cantonese, Catalan, Chinese (simplified), Chinese (traditional), Danish, Dutch, Japanese, Korean, Russian, Swedish, Norwegian, Finnish, Hebrew, Turkish.

Clients can be installed in different languages on the same server.

Client OS compatibility

Arc Pro 6.3 is compatible with the following client Operating Systems.

Operating System	Supported
Windows XP SP3	N
Windows Vista SP2	N
Windows 7 SP1	Y (1) (2)
Windows 8	N
Windows 8.1	Y (1) (3)
Windows 10	Y (1) (3)
Windows 2003 Server SP2	N
Windows 2008 Server SP2	N
Windows 2003 R2 Server SP1	N
Windows 2012 Server	Y (1) (2)
Windows 2012 R2 Server	Y (1) (2) (3)
Windows 2016 R2 Server	Y

Notes on numbered items:

(1)	Support for 32-bit operating systems, WoW 64-bit Emulation and software only.
(2)	Version not part of validation process (latest versions validated, older version compatibility assumed).
(3)	Supported in Desktop and Traditional Mode, not Metro Mode.

Citrix support

Arc Pro 6.3 is compatible with the following Citrix products.

	Fundamentals	Advanced	Enterprise	Platinum
XenApp 7.15	Y	Y	Y	Y
		VDI	Enterprise	Platinum
XenDesktop* 7.15		Y	Y	Y

Testing was performed using Windows 10 64-bit operating system in 'Static' and 'Random' delivery configurations.

Note

The following observations were made during testing:

- XenDesktop 7.15 (Random) is fully functional if the user has Administrative rights. except that user setting changes and logging is lost when the user logs off from XenDesktop
- XenApp 7.15 is supported in following modes:
 - **Local Application Delivery** (Application installed on Server OS will be delivered only)
 - **Hosted Application Delivery via App-V Server** (Server OS Desktop Session is delivered, containing the required application, for that user)
 - Customers running Hosted Application delivery on Windows 2016 would need to run Update KB4034661. For more information see <https://support.citrix.com/article/CTX225819>.

As a second option, multiple users can logon simultaneously on that server and use the same application without having to affect any other users.

Technologies matrix

The following table outlines the compatibility between Arc Pro version 6.3 and other vendor software.

Technology	Arc Pro
Microsoft Presence Integration (Presence)	
Live Communication Server 2005 (LCS)	N
Microsoft Office Communicator 2007 (OCS)	N
Microsoft Office Communicator 2007 R2 (OCS)	N
Microsoft Office Communicator 2010 (OCS)	N
Microsoft Office Communicator 2013 (Lync)	Y (1)
Cisco Unified Presence Server Integration (Presence)	
7.x (7.1.x)	N
8.0 (8.0.x)	N

1: Compatibility

Technology	Arc Pro
8.5 (8.5.x)	N
8.6 (8.6.x)	N
9.0 (9.0.x)	N
9.1 (9.1.x)	N
10.0 (10.0.x)	N
10.5 (10.5.x)	Y (2)
11.0 (11.0.x)	Y (2)
11.5 (11.5.x)	Y (2)
12.0 (12.0.x)	Y (2)
Accessibility	
JAWS v12.x	N
JAWS v13.x	N
JAWS v14.x	N
JAWS v15.x	N
JAWS v16.x	N
JAWS v17.x	Y
JAWS 18.x	Y
Mail Integration (Calendar)	
Microsoft Exchange\Outlook XP (2002)	N
Microsoft Exchange\Outlook 2003	N
Microsoft Exchange\Outlook 2007	N
Microsoft Exchange\Outlook 2010	Y (3)
Microsoft Exchange\Outlook 2013	Y (3)
Microsoft Exchange\Outlook 2016	Y (3)
Mail Integration (Send Email)	
Microsoft Exchange\Outlook XP (2002)	N
Microsoft Exchange\Outlook 2003	N
Microsoft Exchange\Outlook 2007	N
Microsoft Exchange\Outlook 2010	Y
Microsoft Exchange\Outlook 2013	Y
Microsoft Exchange\Outlook 2013	Y

Technology	Arc Pro
Directory Integration	
Microsoft Active Directory (LDAP)	Y (4)
Netscape\iPlanet\SunOne (LDAP)	Y
DC Directory (LDAP)	N
Call Manager User Directory (XML\SOAP)	Y (4)
Microsoft Active Directory Application Mode (ADAM)	Y (4)
Novell eDirectory (LDAP) v8.8	Y
Estos Metadirectory v2/3	Y
Comma-separated Value (FILE)	Y
Call Recording Integration	
Witness Server v7.8.3	Y
QMS (CallRex) 5.x, 6.x, 7.x	Y
Short Message Service (SMS Send)	
HTTP	Y
Email	N
Native\ActiveX	N
Modem	N

Notes on numbered items:

(1)	Presence information is collected by the attendant console application via direct connections to the Microsoft Office Communicator (MOC)/Lync client or the Arc OCS Presence Server. When connecting to the MOC/Lync client, it should be running under the same user profile and platform architecture (32-bit) as the Operator console application.
(2)	Support for SIP connectivity only.
(3)	Calendar information is collected via a direct connection between the Operator console application and Microsoft Office. Redemption is used to work around the Outlook security dialog introduced in Service Pack 2 of Office 2002/2003/2007/2010/2013. The Outlook application should be running under the same user profile and platform architecture (32-bit) as the Operator console application.
(4)	Support for Directories running on supported Server Operating System/CUCM platforms.

2: System minimum requirements

This chapter contains the following information:

- [Arc Pro Server](#)
- [Arc Pro Client](#)

Arc Pro Server

Arc Pro is a client-server application. The server side will need to run on a dedicated PC Server. No other applications must run on this server.

The tables in this section detail the minimum specification required by the Arc Pro Server application.

Applies to:	PC Specification
Hardware Elements	2.40 GHz equivalent CPU with 2 Cores, or better 4.0 GB RAM 64-bit Windows 2012 R2 Server (or higher) 100 GB Hard Drive or better Network Card
Software Elements	.Net Framework v4.6 (included in installer) SQL Server Standard or Enterprise 2012, or SQL 2012 Express for smaller installations where resilience is not required.* Microsoft Excel for Directory Exporting. Support for Skype for Business Pre-Requisites Customers deploying Skype for Business (Arc Pro server side integration) need to install the following pre-requisites: <ul style="list-style-type: none"> • UCMA 4.0 runtime • OSCCore If an Off-box (remote) SQL server is used within your configuration then it must have .Net Framework v3.5 installed. Consult your Microsoft representative if you are looking for license managed or hosted solutions.
The Server should be connected to the network via the TCP/IP protocol.	
The Arc Server will require the appropriate Operating System Licenses.	
The Arc Server is not supported on a domain controller.	
Applies to	PC Specification
With Windows 2008 Server and above, the Admin, CT Server Manager and LDAP Server Manager must be run as an Administrator to enable them to read and write to the configuration files/registry.	

Scalable server specifications

Arc Pro is scalable, providing the following general solutions.

Solution	Operators	Agents	Directory Size	CUCM Connections (Clusters)	Call Traffic (BHCA*)
Small or Mid-Market	10-100	10 -200	10-25,000	Single	Low-Medium (5000)
Enterprise	101 – 250	201 - 500	10-75,000	Single/multiple	Medium (5000 – 15000)
Large Enterprise	251 - 500	500 - 800	10-150,000	Single/multiple	High (15001 - 25000)

*BHCA = Busy Hour Call Attempts

Each of these solutions has different hardware requirements.

Solution	CPU Cores	Memory
Small or Mid-Market	2	4 GB
Enterprise	4	6 GB
Large Enterprise	6	8 GB

If you are unsure which solution you need, always choose the smallest one that satisfies your highest requirement. For example, to support 150 Agents, 50 Operators and 15,000 BHCA, you require an Enterprise Server, because that is the smallest solution that supports that much call traffic.

Anti-virus compatibility

There are many different Anti-Virus products that are supported on an Arc Pro system server. Typically, the most commonly used products are McAfee VirusScan and Norton Anti-Virus.

Both of these products are supported, although any Anti-Virus program is supported on an Arc Pro Server, as long as it is configured as below.

Your Anti-Virus product must support Exclusions - the ability to specify specific files and/or folders that will NOT be scanned by the Anti-Virus program.

The following exclusions should be set when using Anti-Virus on an Arc Pro Server:

File Location	Contains
\\ArcData	System databases
\\Program files (x86)\Arc	Software and application
%ALLUSERSPROFILE%\Arc\Arc Connect\Server	Server application logging folder
\\Apache	Active MQ
\\Temp\CiscoTSP0xxLog	Cisco TSP trace files

Note

The **File Locations** and **File Names** may be changed by your System Administrator.

The files in the above table are constantly being written to and updated during standard operation of the Arc Pro system.

Due to this, these files are permanently being accessed – an Anti-Virus **Scan on access** policy for these files will mean that the files are constantly being scanned for Viruses. This will in turn slow down the operation of the Server. Therefore, excluding these files from being continuously scanned will allow the Server to function as expected

Cisco UCS Servers

Arc Pro supports both UCS-B and UCS-C Servers with the following caveats taken into consideration.

Cisco UCS-B Servers

Cisco UCS-B servers are industry standard platforms featuring a physical chassis with the ability to insert a number of hardware blades, onto which a server operating system (OS) can be deployed. UCS-B features the ability for those server blades to contain a number of Cisco application servers, including Cisco Unified Communications Manager (CUCM) and Unity Messaging. The remaining blades are capable of running standard operating systems and as such it is possible to install third party applications on them. The benefit of a chassis based system is that the blade/server components are connected across a backbone that facilitates high speed and error free communication between each blade.

Arc Solutions offers support in Arc Pro version 5.1.4* and above for Cisco UCS-B servers with the following caveats:

- Support is provided for VMWare ESXi and ESX 4.x and 6.5 with VSphere and VMotion. For more details, see [VMWare and VMotion support](#).
- If Arc is to be deployed on its own blade within the UCS-B, the VMWare image deployed must meet the minimum processor and memory specification as defined by Arc Solutions.
- If Arc Pro Server is installed on the same blade as (is co-resident with) another Cisco application, including Cisco Unified Communications Manager and Unity, the Arc Pro VMWare image must conform to the specifications defined both by Arc Solutions (described in [VMWare and VMotion support](#), and by Cisco Systems, as defined at Cisco's Server Virtualization Guidelines at http://docwiki.cisco.com/wiki/Unified_Communications_Virtualization_Sizing_Guidelines.

Cisco UCS-C Servers

Cisco UCS-C servers are single processor, multi-core, non-chassis machines that are increasingly used to run Cisco Unified Communications Manager. They are available in a number of sizes depending on their application.

Arc Solutions offers support on Arc Pro version 5.1.4* and above for Cisco UCS-C servers with the following caveats:

- Support for Arc Pro on UCS-C servers is allowed by Cisco with CUCM version 9.x and above only, as defined by Cisco Systems.
- The VMWare image deployed must meet the minimum processor and memory specification as defined by Arc Solutions (described in [VMWare and VMotion support](#)) and by Cisco Systems, as defined at Cisco's Server Virtualization Guidelines at http://docwiki.cisco.com/wiki/Unified_Communications_Virtualization_Sizing_Guidelines.

Users experiencing issues with older versions of Arc Pro on a UCS deployment may be asked to upgrade their software to Arc Pro 6.2 or 6.3 if the Arc Pro support team issue diagnosis process dictates it.

Arc Pro Client

The Arc Pro client software is supported in 32-bit and 64-bit (running under WOW64 emulation mode) environments. The tables in this section detail the minimum specification required by the Arc Pro Client applications.

Application	PC Specification
Supervisor	2.2 GHz equivalent CPU or better 2 GB RAM 10GB available Hard Drive space (this is not required by the app, but should be unused for healthy running of the system) Network Card Connected to Network via TCP/IP 1280x1024 or better display card (higher resolution recommended for best results) Windows 10 recommended
Console Operator	2.2 GHz equivalent CPU or better 2GB RAM 10GB available Hard Drive space (this is not required by the app, but should be unused for healthy running of the system) Network Card Connected to Network via TCP/IP 1280x1024 display card or better (we recommend that the resolution is at least 1600 x 1200) 19" widescreen monitor highly recommended. Windows 10 recommended. USB 1.0/2.0 Port for Arc Console Keyboard (if purchased) Sound card and speakers. Windows 10 recommended
Arc Wallboard	2.2 GHz equivalent CPU or better 2GB RAM 10GB available Hard Drive space (this is not required by the app, but should be unused for healthy running of the system) Network Card Connected to Network via TCP/IP 1280x1024 display card or better (we recommend that the resolution is at least 1600 x 1200) 19" widescreen monitor highly recommended Windows 10 recommended.
Arc Agent	2.2 GHz equivalent CPU or better 2GB RAM 10GB available Hard Drive space (this is not required by the app, but should be unused for healthy running of the system) Network Card Connected to Network via TCP/IP 1280x1024 display card or better (higher resolution recommended for best results) Windows 10 recommended







3: Supported handsets

The following phone types are supported as attendant console handsets, or as End Points (display line state and can receive transferred calls).

Note

- Shared lines (multiple lines with the same number) are not supported for attendant console handsets.
- Third-party SIP phones cannot be supported as attendant console handsets or for line state.
- Arc Pro does not support logging on any device that has a duplicate DN, or that uses Extension Mobility.

Y = supported, N = unsupported

Model	Image	SIP	SCCP	Console		End Point
				SIP	SCCP	
3905		Y	N	N	N	Y (1)
3911		Y	N	N	N	Y
3951		Y	N	N	N	Y
6901		Y	Y	N	N	Y
6911		Y	Y	N	Y	Y
6921		Y	Y	N	Y	Y

3: Supported handsets

Model	Image	SIP	SCCP	Console		End Point
				SIP	SCCP	
6941		Y	Y	Y	Y	Y
6945		Y	Y	N	Y	Y
6961		Y	Y	Y	Y	Y
7821		Y	N	Y	Y	Y
7841		Y	N	Y	Y	Y
7861		Y	N	Y	Y	Y
7902		N	Y	N	N	N
7905		Y	Y	Y	Y	Y

3: Supported handsets

Model	Image	SIP	SCCP	Console		End Point
				SIP	SCCP	
7906		Y	Y	Y	Y	Y
7910		N	Y	N	Y	Y
7911		Y	Y	Y	Y	Y
7912		Y	Y	N	Y	Y
7915		Y	Y	Y	Y	Y
7916		Y	Y	Y	Y	Y
7920		N	Y	N	N	N
7921		N	Y	N	N	Y
7925		N	Y	N	N	Y

3: Supported handsets

Model	Image	SIP	SCCP	Console		End Point
				SIP	SCCP	
7925G		N	Y	N	N	Y
7925G-EX		N	Y	N	N	Y
7926		N	Y	N	N	Y
7931		Y (3)	Y	Y (3)	Y (3)	Y
7935		N	Y	N	N	Y
7936		N	Y	N	N	Y
7937		N	Y	N	Y	Y
7937G		N	Y	N	N	Y
7940		Y	Y	N	Y	Y (2)
7941		Y	Y	Y	Y	Y

3: Supported handsets

Model	Image	SIP	SCCP	Console		End Point
				SIP	SCCP	
7941G-GE		Y	Y	Y	Y	Y
7942		Y	Y	Y	Y	Y
7942-G		Y	Y	Y	Y	Y
7945		Y	Y	Y	Y	Y
7945G		Y	Y	Y	Y	Y
7960		Y	Y	N	Y	Y (2)
7961		Y	Y	Y	Y	Y
7961G-GE		Y	Y	Y	Y	Y
7962		Y	Y	Y	Y	Y
7965		Y	Y	Y	Y	Y

3: Supported handsets

Model	Image	SIP	SCCP	Console		End Point
				SIP	SCCP	
7965G		Y	Y	Y	Y	Y
7970		Y	Y	Y	Y	Y
7971		Y	Y	Y	Y	Y
7975		Y	Y	Y	Y	Y
7985		N	Y	N	Y	Y
8811		Y	N	Y	N	Y
8851		Y	N	Y	N	Y
8841		Y	N	Y	N	Y
8861		Y	N	Y	N	Y

3: Supported handsets

Model	Image	SIP	SCCP	Console		End Point
				SIP	SCCP	
8941		Y	N	Y	N	Y
8945		Y	N	Y	N	Y
8961		Y	N	Y (3)	N	Y
9951		Y	N	Y (3)	N	Y
9971		Y	N	Y (3)	N	Y
Cius		Y	N	N	N	Y
Cisco CSF	N/A	N	N	Y	N	N
DX650		Y	N	Y	Y	Y
DX70		Y	N	Y	Y	Y

3: Supported handsets

Model	Image	SIP	SCCP	Console		End Point
				SIP	SCCP	
DX80		Y	N	Y	Y	Y
IP Communicator		Y	Y	Y	Y	Y
Jabber Client		Y	N	Y	N	Y
SPA 8800	N/A	N	N	N	N	N
VG 224	N/A	N	N	N	N	N

Notes on numbered items:

(1)	No BLF, but can receive transfer.
(2)	Supported for SCCP only.
(3)	Support with disable rollover.

4: Performance and utilization

This chapter contains the following information:

- [General bandwidth recommendations](#)
- [Network latency limitations](#)
- [Attendant Console](#)
- [Server](#)
- [Voice Connect](#)
- [Supervisor](#)
- [Wallboard](#)

General bandwidth recommendations

Location-based Call Admission Control may be implemented to control the bandwidth usage across the WAN. A maximum amount of bandwidth may be configured for calls to and from each remote location. When an Arc controlled CTI Route Point or CTI Port is created, the location should be set to **None**. However, this effectively ensures that no bandwidth limits will apply to that device.

Locations may be implemented which will account for bandwidth according to Region settings, to define the codec used between two endpoints.

Call type	Bandwidth
Calls routed across a LAN typically use the G711 codec	64 Kbps
Calls routed across the WAN may use the G729 codec	8 Kbps

If different compression types are to be used to reduce the amount of bandwidth needed across the WAN, then a transcoder will be needed. In addition, further bandwidth is used by IP communications between the Arc Server and the Console Attendant as described in the following sections.

Network latency limitations

Arc Pro can operate over WAN (Wide Area Networks), however there are requirements as to the maximum latency that the system can operate under before the user experience begins to deteriorate. Between the Arc Pro Server and the Cisco Unified Call Manager, where the TAPI communication takes place, the maximum latency permitted is defined by Cisco. This value can be found in *Cisco's TAPI documentation*.

Between the Arc Pro Server and any Arc Pro Clients, the maximum latency permitted is 150ms round trip time.

In cases where the SQL Server that Arc Pro is using is not located on the Arc Pro Server, the maximum latency permitted is 150ms round trip time. This applies to the Arc Pro Server and any clients connections to the SQL Server.

Attendant Console

The following log-in tests used a directory of 250 contacts. The console by default pulls back a maximum of a 1000 contacts with any one SQL search therefore the recorded values represent the maximum log-in bandwidth required regardless of directory size.

Activity as measured from the Client	Download Bandwidth (KB)	Upload Bandwidth (KB)
Client login (Operator – direct access mode)	1,092	12.7
With 1000 Contacts	843.70 +193%	11.65 +85%
Client login (Operator – direct access mode)	333.28	11.65
With 100 Contacts		
Client login (Operator – memory mode)	2,134	8.4
With 1000 Contacts	N/A N/A	N/A N/A

Directory and Busy Lamp

Every search made of the Contact Directory will return a number of matches within the SQL database. The bandwidth requirements will depend on the number of contacts being returned and the amount of data within each contact.

Activity as measured from the Client	Download Bandwidth (KB)	Upload Bandwidth (KB)
20 contact SQL search using attendant console	8.7 19.51 +13.10%	4.5 8.81 +22.53%
20 contact SQL search using attendant console with Scalable Busy Lamp Enabled (New subscriptions)	33.2 17.88 +69.90%	8.3 9.98 -20.96%
20 contact SQL search using attendant console with Scalable Busy Lamp Enabled (Cached subscriptions)	13.42 +42.61%	7.21 +28.98%

Presence integration

Activity as measured from the Client	Download Bandwidth (KB)	Upload Bandwidth (KB)
CUPS searching 'get' for typical directory view of 20 contacts (New subscriptions)	8.9 70.74	4.5 32.96
CUPS searching 'get' for typical directory view of 20 contacts (Cached subscriptions)	18.57 93.97	7.18 54.89
OCS presence 'get' for typical directory view of 20 contacts with a short note (New subscriptions)	24.58 22.77	8.42 8.07
OCS presence 'get' for typical directory view of 20 contacts with a short note (Cached subscriptions)	27.83 24.81	8.04 12.47
Calendar (using Outlook interface) 'get' for typical directory view of 20 contacts	NA (Data obtained from outlook session)	NA (Data obtained from outlook session)

Server

Database Synchronization with CUCM (Arc 5.1.1 onwards)

The other major requirement for Arc attendant console outside of the call handling requirements is the initial synchronizing of the Contacts DB. This is undertaken via an LDAP synch with CUCM. Again the amount of bandwidth required depends on the amount of contacts and the amount of data within each contact.

Activity as measured from the Arc Server	Download Bandwidth (KB)	Upload Bandwidth (KB)
Initial synchronisation of the Arc directory contacts database using LDAP synchronisation with a CUCM source of 50 basic contacts (3x fields).	376.4 1,043.05 +302.75%	461 185.08 -52.02%
Initial synchronisation of the Arc directory contacts database using LDAP synchronisation with an AD source of 50 basic contacts (8x fields).	103.2 109.50 -71.77%	135 118.23 -80.09%
Initial synchronisation of the Arc directory contacts database using LDAP synchronisation with an AD source of 20,000 basic contacts (8x fields).	33,596 31,570 -4.65%	49,918 104,950 -5.61%
Initial Full Sync based on the following: <ul style="list-style-type: none"> • 50 Agents (Each agent has 1 skill assigned) • 50 Operators (Each operator has 1 queue assigned) • 10 Supervisors • 1 Wallboard user • 1 Community • 2 Permission Groups • 25 Agent Skills • 25 Agent Queues • 10 Console Queues Directory containing 1000 contacts	7,144 356.44 -86.77%	3,494 108.38 +13.77%
Typical bandwidth per individual change in this example adding a new console queue.	214 193 -10%	9.5 7.4 -22%

LDAP or Equivalent Integration

Activity as measured from the Arc Server	Download Bandwidth (KB)	Upload Bandwidth (KB)
Initial connection	20 22.43 +91.05%	10 7.86 +38.42%
Maintaining (contact update in AD source in this example a phone number edit)	4.3 4.10 +27.32%	7.4 2.53 -57.55%

Voice Connect

Activity as measured from the Arc Voice Server	Download Bandwidth (KB)	Upload Bandwidth (KB)
Service start-up with all waves locally cached	13	3.6
	0.86	0.05
	-93.47%	-98.70%
Server start-up with all waves locally cached	2,916	39
	41.60	0.09
	-98.47%	-99.77%

Streaming of WAV files per queue/call, based on our standard messages:

Voice Connect activity (playing of prompts)	Download Bandwidth (KB)	Upload Bandwidth (KB)
Default voice messages (all of the canned voice messages produce very much the same bandwidth results, the recorded result is for "Your call will be answered shortly, thank you for holding")	25	38
	N/A	N/A
	N/A	N/A

Supervisor

Activity as measured from the Client	Download Bandwidth (KB)	Upload Bandwidth (KB)
Client login	340.7	6.6
	345.04	4.39
	-11.57%	-57.66%
System Monitor, per client, per broadcast	35	0
	35.05	0
	0%	0%
Reporting	Typically <100 per report dependent to the type of the report and the amount of data it contains	Typically <5
Online updates, per change	<1	Typically <5

Wallboard

Activity as measured from the Client	Download Bandwidth (KB)	Upload Bandwidth (KB)
Client login	301.7	0.33
	232.66	0.39
	+1.51%	0%
Updates -per broadcast per Wallboard	35	0
	35.05	0
	0%	0%