Compatibility and Performance with Arc Pro

Version 6.1.1

Revised: 18 March 2015

This document provides a comprehensive overview of Arc Pro version 6.1.1 and its compatibility with operating environments, software, and hardware, and bandwidth utilization.

You can access the latest Arc Pro documentation at:

http://enghouseinteractive.co.uk/console-cisco-enterprise-edition-technical-documentation

You can access the Arc Solutions website at:

http://www.arcsolutions.com

Join the Arc Solutions Forum at:

http://forum.arcsolutions.com

Registered partners can access the Arc Solutions Extranet at:

www.arcsolutions.com/extranet

Contents

Related Arc Documents

When using this document please also consult the following:

- **Arc Compatibility Matrix** for the Cisco Unified Communications Manager supported by Arc software versions
- **Arc Design Guide** for best practices and how to plan your deployment
- **Arc Installation Manual v 6.1.1** or, for older versions of Arc, the individual installation documents for your server component or client applications
- **Arc Configuration Manual v 6.1.1** for a comprehensive overview of the configuration of the server component
- **Arc Provisioning Wizard Manual v6.1.1** provides an overview of using the provisioning wizard to configure the Arc Pro software
- **CUCM Configuration Manual for Arc Pro v6.1.1** for a description of the configuration requirements of Cisco Unified Communication Manager versions 7.x, 8.x, 9.x and 10.x. These are also provided as separate documents.

Compatibility

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 32-bit only	Server 2008 R2 64-bit only	Server 2012 64-bit only	Server 2012 R2 64-bit only
7.1	✔ (1)(2)	✔ (1)(2)	✔ (4)	✖	✖	✖
8.0	✖	✖	✔ (4)	✖	✖	✖
8.5	✖	✖	✔ (4)	✔ (3)	✖	✖
8.6	✖	✖	✔ (4)	✔ (4)	✖	✖
9.0	✖	✖	✔ (4)	✔ (4)	✖	✖
9.1	✖	✖	✔ (4)	✔ (4)	✖	✖
10.0	✖	✖	✔ (4)	✔ (4)	✔	✖
10.5	✖	✖	✔ (4)	✔ (4)	✔	✔

(1) Limited Support	*If a problem is diagnosed as being a fault in the Arc software and <u>not relating to the server platform itself</u>, Arc Solutions will investigate the problem through the normal process and consider the option of providing bug fixes for the software. If, however, the problem is diagnosed as being directly related to the server platform, Arc Solutions reserves the right to request that the server platform is upgraded to one fully supported before further diagnosis and be completed and any bug fixes considered.*
(2) Support for Windows 2003 ended 13/07/2010	*Windows 2003:* *http://support.microsoft.com/lifecycle/search/default.aspx?sort=PN& alpha=windows+server+2003&Filter=FilterNO* *Windows 2003 R2:* *http://support.microsoft.com/lifecycle/search/default.aspx?sort=PN& alpha=windows+server+2003+R2&Filter=FilterNO*
(3) Windows Server 2008 R2 64-bit support	*Support only for version 8.5.1 and later*
(4) Windows 2008 support	*Supported by Arc Solutions and Cisco Systems. Refer to the Cisco TSP documentation at http://developer.cisco.com/web/tapi/docs*

Cisco Unified Communications Manager Compatibility

Arc Pro version 6.1.1 is compatible with the Cisco Unified Communication Managers (CUCM) and the respective Cisco TAPI TSP shown in the *Compatibility Matrix*.

Installers, engineers and customers are advised that an issue exists in version 8.6.2 of Cisco Unified Communications Manager whereby CTI ports fail to register in certain circumstances, causing significant problems with call control within the Arc Pro server.

This issue is observed on CUCM build version 8.6.2.20000-2 with TSP version 8.6(2.2) on Windows 2008 Service Pack 2 32-bit. The Cisco ticket reference is CSCtw79059. Since this is solely a CUCM issue and is outside of Arc Solutions domain, you are advised to contact Cisco for updated status on this issue.

VMWare and VMotion Support

Arc supports deployment in VMWare virtual server environments. Arc Pro is supported in a live environment on VMWare EXSX and ESXi version 4.x and 5.x 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 at
http://kb.vmware.com/selfservice/microsites/search.do?language=en_US&cmd=displayK
C&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	Windows 2003 R1 32-bit only	Windows 2003 R2 32-bit only	Server 2008 R1 32-bit only	Server 2008 R2 64-bit only	Server 2012 64-bit only	Server 2012 R2 64-bit only
2005 32-bit	✔ (1)(2)	✔ (1)(2)	✔	✘	✘	✘
2008 32-bit	✔ (1)(2)	✔ (1)(2)	✔	✔	✔ (3)	✔ (3)
2008 64-bit	✘	✘	✘	✔	✔ (3)	✔ (3)
2008 R2 32-bit	✔ (1)(2)	✔ (1)(2)	✔	✔	✔ (3)	✔ (3)
2008 R2 64-bit	✘	✘	✘	✔	✔ (3)	✔ (3)
2012 (32-bit and 64-bit)	✘	✘	✘	✔	✔	✔
2014 (32-bit and 64-bit)	✘	✘	✘	✔	✔	✔

(1) Limited	*If a problem is diagnosed as being a fault in the Arc software and not relating to the server platform itself, Arc Solutions will investigate the*

Support	*problem through the normal process and consider the option of providing bug fixes for the software. If, however, the problem is diagnosed as being directly related to the server platform, Arc Solutions reserves the right to request that the server platform is upgraded to one fully supported before further diagnosis and be completed and any bug fixes considered.*
[2] Support for Windows 2003 ended 13/07/2010	*Windows 2003:* *http://support.microsoft.com/lifecycle/search/default.aspx?sort=PN&alpha=windows+server+2003&Filter=FilterNO* *Windows 2003 R2:* *http://support.microsoft.com/lifecycle/search/default.aspx?sort=PN&alpha=windows+server+2003+R2&Filter=FilterNO*
[3]	Requires Service Pack 3.

Microsoft SQL 64-bit Support

Support for Microsoft SQL Server (2005 and 2008) 64-bit is provided in Arc Pro 6.0. x on CUCM 8.6.2 and above. However, in older versions of Arc Premium (5.1.4 and below) support for Microsoft SQL Server (2005 and 2008) is offered for **32-bit versions of the operating system only**.

SQL Express Support

The performance limitation that SQL Server Express possesses is that it can access only a single CPU and 1 GB of RAM with a maximum database size of 4Gb.

In sites where one or more of the following are expected:

- More than 10 operators or agents
- More than 500 calls per user per day
- More than 10,000 contacts in the directory

Arc recommends you consider using SQL Server Standard or Enterprise. 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. ***Please consult your Microsoft representative if you are looking to license managed or hosted solutions.***

Client OS Compatibility

Arc Pro 6.1 is compatible with the following client Operating Systems.

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

(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 6.1.1 is compatible with the following Citrix products.

	Fundamentals	Advanced	Enterprise	Platinum
XenApp 6.5	✓	✓	✓	✓
	VDI	Enterprise	Platinum	
XenDesktop* 5.6	✓	✓	✓	

*Testing was performed using Windows 7 64-bit operating system in 'Dedicated' and 'Pooled random' configurations.

Note: The following observations were made during testing:

- XenDesktop 5.6 (Pooled 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 6.5 is fully functional provided that Windows User Authentication Control (UAC) is switched off, except for logging issues. Logging settings point to a physical location that is shared amongst XenApp session users and thus they are overwritten if more than one XenApp session is run simultaneously. This can be prevented by modifying the logging location to a session-independent location.

Technologies Matrix

The following table outlines the compatibility between Arc Pro version 6.1.1 and other vendor software.

Technology	Arc Pro
Microsoft Presence Integration (Presence)	
Live Communication Server 2005 (LCS)	✖
Microsoft Office Communicator 2007 (OCS)	✖
Microsoft Office Communicator 2007 R2 (OCS)	✓ (1) (5)
Microsoft Office Communicator 2010 (OCS)	✓ (1) (5)
Microsoft Office Communicator 2013 (Lync)	✓ (1) (5)
Cisco Unified Presence Server Integration (Presence)	
7.x (7.1.x)	✓

8.0 (8.0.x)	✔ (4)
8.5 (8.5.x)	✔ (4)
8.6 (8.6.x)	✔ (4)
9.0 (9.0.x)	✔ (4)
9.1 (9.1.x)	✔ (4)
10.0 (10.0.x)	✔ (4)
10.5 (10.5.x)	✔ (4)
Accessibility	
JAWS v12.x	✘
JAWS v13.x	✘
JAWS v14.x	✘
JAWS v15.x	✔
JAWS v16.x	✔
Mail Integration (Calendar)	
Microsoft Exchange\Outlook XP (2002)	✔ (2)
Microsoft Exchange\Outlook 2003	✔ (2)
Microsoft Exchange\Outlook 2007	✔ (2)
Microsoft Exchange\Outlook 2010	✔ (2)
Microsoft Exchange\Outlook 2013	✔ (2)
Mail Integration (Send Email)	
Microsoft Exchange\Outlook XP (2002)	✔
Microsoft Exchange\Outlook 2003	✔
Microsoft Exchange\Outlook 2007	✔

Microsoft Exchange\Outlook 2010	✓
Microsoft Exchange\Outlook 2013	✓
Directory Integration	
Microsoft Active Directory (LDAP)	✓ (3)
Netscape\iPlanet\SunOne (LDAP)	✓
DC Directory (LDAP)	✗
Call Manager User Directory (XML\SOAP)	✓ (3)
Microsoft Active Directory Application Mode (ADAM)	✓ (3)
Novell eDirectory (LDAP) v8.8	✓
Estos Metadirectory v2/3	✓
Comma-separated Value (FILE)	✓
Call Recording Integration	
Witness Server v7.8.3	✓
QMS (CallRex) 5.0, 5.1, 5.2, 5.3 and 5.4	✓
Short Message Service (SMS Send)	
HTTP	✓
Email	✗
Native\ActiveX	✗
Modem	✗

(1) Presence information is collected via a direct connection between the attendant console application and the Microsoft Office Communicator (MOC) client.

(2) Calendar information is collected via a direct connection between the attendant 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.

(3) Support for Directories running on supported Server Operating System/CUCM platforms.

(4) Support for SIP connectivity only.

(5) Presence information is collected via a direct connection between the attendant console application and the Arc OCS Presence Server.

System Minimum Requirements

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 32-bit Windows 2008 Server 100 GB Hard Drive or better Network Card
Software Elements	.Net Framework v3.5 (included in installer) SQL Server Standard or Enterprise 2008, or SQL 2008 Express for smaller installations where resilience is not required.* Microsoft Excel for Directory Exporting. Microsoft Office Communication Server 2007 R2, Core Components for running Arc OCS Server. **(Note: Microsoft OCS R1 is not supported).** If an Off-box (remote) SQL server is used within your configuration then it must have .Net Framework v3.5 installed. *Please consult your Microsoft representative if you are looking to 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.	
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.	
If the reporting functionality within the Administrator is required then it is advisable to disable the User Account Control within the Operating System.	

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 trace files
\\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 Premium 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 5.x with VSphere and VMotion. For more details, see VMWare and VMotion Support, page 4.
- 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, page 4) 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 Premium 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 page 4) and by Cisco Systems, as defined at Cisco's Server Virtualization Guidelines at

* Users experiencing issues with older versions of Arc on a UCS deployment may be asked to upgrade their software to Arc 6.0, 6.0.1 or 6.1.1 if the Arc support team issue diagnosis process dictates it.

Arc Pro Client

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 7 recommended **Note**: If the report functionality is required then it is advisable to disable the User Account Control when operating Supervisor on Windows 2008, Vista, Windows 7 and Windows 8.
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 7 recommended. USB 1.0/2.0 Port for Arc Console Keyboard (if purchased) Sound card and speakers. **Note:** The console Calendar integration requires a Microsoft Exchange Server 2007 or better. For users' calendars to be available to Arc Pro, they must be set as public folders.

Application	PC Specification
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 7 recommended
	USB 1.0/2.0 Port for Arc Console Keyboard (if purchased)
	Sound card and speakers.
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 7 recommended

* The Arc Pro client software is supported in 32-bit and 64-bit (running under WOW64 emulation mode) environments.

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.

✔ = supported, ✖ = unsupported

Model	Image	SIP	SCCP	Console		End point
				SIP	SCCP	
3905		✔	✖	✖	✖	✔ [1]
3911		✔	✖	✖	✖	✔
3951		✔	✖	✖	✖	✔
6901		✔	✔	✖	✖	✔
6911		✔	✔	✖	✔	✔
6921		✔	✔	✖	✔	✔
6941		✔	✔	✔	✔	✔

Model	Image	SIP	SCCP	Console		End point
				SIP	SCCP	
6945		✔	✔	✖	✔	✔
6961		✔	✔	✔	✔	✔
7821		✔	✖	✔	✔	✔
7841		✔	✖	✔	✔	✔
7861		✔	✖	✔	✔	✔
7902		✖	✔	✖	✖	✖
7905		✔	✔	✔	✔	✔
7906		✔	✔	✔	✔	✔
7910		✖	✔	✖	✔	✔

Model	Image	SIP	SCCP	Console		End point
				SIP	SCCP	
7911		✔	✔	✔	✔	✔
7912		✔	✔	✘	✔	✔
7915		✔	✔	✔	✔	✔
7916		✔	✔	✔	✔	✔
7920		✘	✔	✘	✘	✘
7921		✘	✔	✘	✘	✔
7925		✘	✔	✘	✘	✔
7925G		✘	✔	✘	✘	✔
7925G-EX		✘	✔	✘	✘	✔

Model	Image	SIP	SCCP	Console		End point
				SIP	SCCP	
7926		✗	✓	✗	✗	✓
7931		✓ [3]	✓	✓ [3]	✓ [3]	✓
7935		✗	✓	✗	✗	✓
7936		✗	✓	✗	✗	✓
7937		✗	✓	✗	✓	✓
7937G		✗	✓	✗	✗	✓
7940		✓	✓	✗	✓	✓ [2]
7941		✓	✓	✓	✓	✓
7941G-GE		✓	✓	✓	✓	✓
7942		✓	✓	✓	✓	✓
7942-G		✓	✓	✓	✓	✓

Model	Image	SIP	SCCP	Console		End point
				SIP	SCCP	
7945		✓	✓	✓	✓	✓
7945G		✓	✓	✓	✓	✓
7960		✓	✓	✗	✓	✓ [2]
7961		✓	✓	✓	✓	✓
7961G-GE		✓	✓	✓	✓	✓
7962		✓	✓	✓	✓	✓
7965		✓	✓	✓	✓	✓
7965G		✓	✓	✓	✓	✓
7970		✓	✓	✓	✓	✓
7971		✓	✓	✓	✓	✓
7975		✓	✓	✓	✓	✓

Model	Image	SIP	SCCP	Console		End point
				SIP	SCCP	
7985		✗	✓	✗	✓	✓
8851		✓	✗	✓	✓	✓
8941		✓	✓	✓	✓	✓
8945		✓	✓	✓	✓	✓
8961		✓	✗	✓ [3]	✗	✓
9951		✓	✗	✓ [3]	✗	✓
9971		✓	✗	✓ [3]	✗	✓
Cius		✓	✗	✗	✗	✓
Cisco CSF	N/A	✗	✗	✓	✗	✗

Model	Image	SIP	SCCP	Console		End point
				SIP	SCCP	
DX650		✓	✗	✓	✓	✓
DX70		✓	✗	✓	✓	✓
DX80		✓	✗	✓	✓	✓
IP Communicator		✓	✓	✓	✓	✓
Jabber Client		✓	✗	✓	✗	✓
SPA 8800	N/A	✗	✗	✗	✗	✗
VG 224	N/A	✗	✗	✗	✗	✗

[1]. No BLF, but can receive transfer.

[2]. Supported for SCCP only.

[3]. Support with disable rollover.

Performance and Utilization

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 at http://developer.cisco.com/web/tapi/docs.

Between the Arc Pro Server and any Arc Pro Clients, the maximum latency permitted for each direction is 150ms (300ms round trip).

In cases where the SQL Server that Arc Pro is using is not located on the Arc Pro Server, the maximum latency permitted for each direction is 150ms (300ms round trip). 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) With 1000 Contacts	*1,092* 843.70 +193%	*12.7* 11.65 +85%
Client login (Operator – direct access mode) With 100 Contacts	333.28	11.65
Client login (Operator – memory mode) With 1000 Contacts	*2,134* NA NA	*8.4* NA NA

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 a 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 a AD source of 20,000 basic contacts (8x fields).	*33,596* 31,570 -4.65%	*49,918* 104,950 -5.61%

Server Resilience (Replication with SQL 2008 Enterprise)

Activity as measured from the Subscriber	Download Bandwidth (KB)	Upload Bandwidth (KB)
Initial Full Sync based on the following: 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 N/A N/A	38 N/A N/A

Supervisor

Activity as measured from the Client	Download Bandwidth (KB)	Upload Bandwidth (KB)
Client login	340.7 345.04 -11.57%	6.6 4.39 -57.66%
System Monitor, per client, per broadcast	35 35.05 0%	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 +1.51%	0.39 0%
Updates -per broadcast per Wallboard	35 35.05 0%	0 0 0%

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