



SPHERICALL V7.0.1 SYSTEM REQUIREMENTS

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URGENT INFORMATION: This document contains information that is current for the date stated above. If there are any post-release changes to Requirements or the Release Notes, you will find that information updated on the web site at: <http://www.NECUnified.com>.

REQUIREMENT CONTENTS

Introduction	page -2
Sphericall License Key File Information	page -2
Sphericall System Sizing Requirements	page -4
Trunk and Voice Mail Sizing Requirements	page -7
Telco or PBX Interface Requirements	page -7
System Hardware, Software & Feature Compatibilities	page -9
SIP Feature Limitations	page -13
VOIP Networking Requirements	page -15
Logins & Permissions Requirements	page -19
Microsoft Windows and IP Networking Requirements	page -25
TCP & UDP Port Requirements	page -27
Sphericall Manager: Voice Mail & Media Servers	page -32
Sphericall Desktop & Softphone or Operator	page -42
Optional Sphericall System Integrations	page -47

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INTRODUCTION TO REQUIREMENTS

The role of the Spherically system installer is to install the Spherically system in a new or existing LAN/WAN/MAN environment. Significant aspects of the Spherically system installation involve and require telecommunications as well as networking essentials. Included in this document are the minimum network environment requirements, which must be met to ensure a successful installation of a Spherically system. The Spherically system capacities and design best practices are included, making this document useful for global system design.

Definitions/Conventions of this document:

- **Requirements** are the must-have capabilities or infrastructure.
- **Options** often have identified limitations and are to be considered secondary to requirements.
- **Exclusions** are items identified as being detrimental to system performance and are not allowed under any circumstances.
- **Recommendations** are not required, optional, or excluded but *suggested* or *preferred* configuration parameters for your organization's network and/or Spherically system.

SPECIAL NOTICES

SPHERICALL LICENSE KEY FILE REQUIREMENT:

Upgrading to v7.x of Spherically from *any version earlier than v6.0* requires a Spherically License Key File to complete the installation, upgrade or expansion of license capacity.

DO NOT PROCEED WITH INSTALLATION WITHOUT THIS KEY, which will be provided to you upon authorization by NEC. Refer to the Spherically Manager section of this document for more information.

OPERATING SYSTEM NOTICE: The Spherically system does *not* support:

Spherically Desktop on the following operating systems

- Microsoft Windows NT Workstation
- Microsoft Windows 98x
- Microsoft Windows ME

Spherically Administrator on the following server operating system

- Microsoft Windows Server 2000; Win2K Server and Professional are not supported for administration and maintenance from a local client P.C.

LICENSING

Some products that integrate with the Spherically system may require an integrated license. The software is designed to recognize and access some third-party licensable elements.

Current entities licensed with an integrated license are as follows:

- Initial Startup License
- Spherically User License
- Station Access License
- Trunk Access License
- Spherically Call Recording License

- Spherically Voice Mailbox License
- UC Add On Components

THE LICENSE FILE IS REQUIRED:

Perform the following steps during installation/upgrade or license port expansion:

- On the Primary Manager: When prompted during installation or upgrade, browse to the license file. This file is called License.xml.
- Once you have selected this file, the software installation will continue.

Upgrades: The v7.0 license file is not compatible with versions of software prior to v6.4 due to the changes in the format of the license. Often administrators will receive the new license file and place it on the Spherically Manager prior to upgrade. This is possible when upgrading from v6.4, but not from earlier versions.

Note: Once this file resides on the server and is incorporated into the build of the software, the system requires that file to remain in place at all times.

SPHERICALL SYSTEM SIZING REQUIREMENTS

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Table .1 System Sizing Capacities

System Sizing Components	System Size Limit	Comments
Max # Spherical Managers on the same Spherical System	20	Exceeding this limit creates an unmanageable solution.
Max # Ports (Station or Trunk) on the same Spherical System	30,000	This number represents the maximum number of Ports (stations or trunks) at the maximum number of Spherical Managers based on the server hardware configuration used (see below).
Maximum Busy Hour Call Attempts (BHCA)	25,000 per server 500,000 per system	BHCA is the number of calls attempted at the busiest hour of the day. This does not represent sustained call attempts. This maximum is based on the recommended server configuration noted in the "Server Capacity Requirements" Table

Table .2 Server Sizing Configuration

Configuration	Server Hardware	Maximum Lines per Server (Any combination of Primary and Secondary)	Maximum Busy Hour Call Attempts per Server
Recommended*	Intel Xeon (E5420) 2.5 GHz Quad Core 1333 MHz System Bus 12 MB L2 Cache 8 GB RAM 240 GB HDD	3000	25000
Minimum Supported*	Intel Xeon 2.4 GHz Dual CPU w/Hyper-Threading 533 MHz System Bus 512 KB L2 Cache 1 GB RAM 34 GB HDD	2000	10000
	Intel Pentium 4 2.80 GHz w/Hyper-Threading 800 MHz System Bus 1 MB L2 Cache 1 GB RAM 38 GB HDD	2000	10000
Multi-use* The Spherical system can support the combination of the Spherical Manager, Active Directory server, and Exchange server running on the same machine for voice mail applications only (not providing e-mail service to users). EXCLUSION: Exchange 2007 requires a 64-bit server. You must match the CPU bits for SBS software installations.	Intel Xeon (L5420) 2.5 GHz Quad Core 1333 MHz System Bus 12 MB L2 Cache 4 GB RAM 240 GB HDD	3000	25000
<p>*Configuration requirements assume the following:</p> <ul style="list-style-type: none"> • "Typical" business call volumes. • Any mix of approved IP phones, media gateways, Spherical Desktops or other approved end-points. • The maximum number of ports includes both station and trunk lines/channels. • A Spherical Manager also acts as a Media Server. • Line monitoring is performed using multicast, NOT unicast. • Not considered here are customer-specific circumstances such as: geographic distribution, capabilities of WAN links, higher than "typical" call volumes, complex Media Server applications, etc. • Always consult with your Certified Partner when planning any specific implementations. • Should you have specific questions regarding Spherical software upgrades and compatibility with your existing Spherical Manager servers, contact your Certified Partner for clarification. <p>NOTE: Feature specific guidelines may need to be considered for all minimum hardware configurations. See considerations later in this document pertaining to Call Recording, disk space storage, and/or Voice Mail use of Call Sessions on the Media Server.</p>			

Table .3 Spherically Process Core Allocation

Process	Number of Processor Cores Used		
	2 Total Cores	4 Total Cores	8+ Total Cores
DBServer	0	0	0
MGC	1	1	1
MediaServer	0	2	2
DesktopManager	1	2	3
CallLogger	0	3	4
WebServer	1	3	5

NEC SPHERE V7.0 HARDWARE CAPACITIES

Table .4 Ports Per Device

Device	Ports
COHub	24 T1, 30 E1
PhoneHub	24 FXS
BranchHub	18 (6 FXO; 12 FXS)
IP Phone (SIP or Eth)	1
MeetingHub	60
Compatible Media Gateways	1 port per FXO/FXS connection

TRUNK SIZING

Note: This is for planning only. Traffic studies are required for accurate assessment of port ratios. Information on Erlang calculations for the purpose of planning is available in *Book 3* for Spherically Voice Mail installations and *Book 4* for SMDI voice mail integrations.

Table .5 Trunk Sizing

Busy Hour Call Usage		Stations							
		50	100	200	300	400	500	750	1000
Low	Number of Trunks	6	10	18	25	30	35	45	55
Medium		9	15	30	37	45	52	75	90
High		12	20	40	50	60	70	100	125

SPHERICALL TELCO REQUIREMENTS

Table .6 Interface Requirements

Transport Mechanism	Framing and Line Coding	Features/Protocols
Analog Trunk (BranchHub)	<ul style="list-style-type: none"> • NA 	<ul style="list-style-type: none"> • Loop start only • Caller ID only Note: Caller ID is the ONLY analog line service supported by the BranchHub. • US Caller ID: Telcordia GR-30-CORE • UK Caller ID: <ul style="list-style-type: none"> - BT type - defined in BT document SIN227 - CCA type - defined in specification TW/P&E/312 • All Centrex or Essex features must be removed from the analog line before using with a BranchHub.
E1 R2 (Mexico Variants)	<ul style="list-style-type: none"> • MFAS (non-CRC) • HDB3 	<ul style="list-style-type: none"> • Caller ID number • DID
E1-ISDN PRI (European Variants)	<ul style="list-style-type: none"> • MFAS (CRC and non-CRC) • HDB3 	<ul style="list-style-type: none"> • Caller ID number • DID • QSIG basic with caller and called party number only
E1 QSIG - <u>New</u> for ECMA Mexico	<ul style="list-style-type: none"> • MFAS (CRC and non-CRC) • HDB3 	<ul style="list-style-type: none"> • Caller ID number • DID • QSIG basic with caller, called party number and name Caller ID
T1-CAS	<ul style="list-style-type: none"> • ESF/B8ZS (Preferred) • SF/D4/AMI (Optional) 	<ul style="list-style-type: none"> • Ground start • Loop start • E & M - DID supported

SPHERICALL V7.0.1 SYSTEM REQUIREMENTS

Sphericall Telco Requirements

Transport Mechanism	Framing and Line Coding	Features/Protocols
T1-ISDN PRI	<ul style="list-style-type: none"> • ESF/B8ZS 	<ul style="list-style-type: none"> • NFAS not supported • NI2 Protocol (preferred) on any CO switch • ATT custom on 5ESS • NT1 custom on DMS • QSIG basic with caller ID and called party number only • ANI and DID supported all protocols • Caller ID name support is available with the following switch configurations: <ul style="list-style-type: none"> - ATT Custom on a 5ESS switch - NI2000 on a DMS100 switch
Softtrunking to carrier	<ul style="list-style-type: none"> • SIP Sphericall system design based on RFC 3261-3265, and on SIP Forum SIP Connect Draft • Requires the use of a VoIP “aware” WAN device, such as an Application Layer Gateway (ALG), router or firewall. This provides NAT traversal, authentication, admission control, proxy redundancy, and security. 	<ul style="list-style-type: none"> • Sphericall to SIP carrier or service provider (Internet based, software based, authentication provided, scalable) <p>Format Requirement: SIP authentication is only supported in MD5 format.</p> <p>Format Exclusion:</p> <ul style="list-style-type: none"> • SIP authentication is not supported in MD5-sess.
OTHER TRUNKING REQUIREMENTS		
TIE LINE or Tandem Trunking		<p>Requirement:</p> <ul style="list-style-type: none"> • HARD tie lines between two PBX systems (Sphericall-to-Sphericall or Sphericall-to-3rd party PBX) are only supported using digital trunks through NEC Sphere COHubs. • SOFT tie lines between two PBX systems (Sphericall-to-Sphericall or Sphericall-to-3rd party PBX, call center, voice mail or call accounting system) are supported using softtrunks. <i>See below for specific requirements.</i> <p>Exclusion:</p> <ul style="list-style-type: none"> • Analog tie lines are NOT supported unless otherwise noted.
SIP Softtrunking		
Softtrunk tie line	<p>SIP Sphericall system design based on RFC 3261-3265, and on SIP Forum SIP Connect Draft</p>	<p>Format Requirement: SIP authentication is only supported in MD5 format.</p> <p>Format Exclusion: SIP authentication is not supported in MD5-sess.</p> <p>Supported integrations with SOFT tie lines include:</p> <ul style="list-style-type: none"> • Sphericall-to-Sphericall • Sphericall-to-3rd party PBX • Sphericall to call center, voice mail or call accounting system <p>Router Requirement Note: Spanning the public and/or private internet(s) will require a SIP aware or application layer gateway (ALG) router/firewall to properly pass signalling traffic.</p> <p>Tested ALG(s):</p> <ul style="list-style-type: none"> • Ingate Firewall SIP ALG

TIE LINE REQUIREMENTS

Table .7 Tie Line Requirements

Tie Line Type	Signalling	Limitations
T1-CAS	E and M	<ul style="list-style-type: none"> Hardware Passing of dialed digits only (no named callerID)
T1-ISDN	QSig Basic	<ul style="list-style-type: none"> Hardware
T1-ISDN	PRI	<ul style="list-style-type: none"> Hardware The Spherical media gateway only emulates user side The PBX must support network side
SIP		<ul style="list-style-type: none"> Requires the use of a VoIP "aware" WAN device, such as an Application Layer Gateway (ALG), router, or firewall. This provides NAT traversal, authentication, admission control, proxy redundancy, and security.

SYSTEM HARDWARE & SOFTWARE COMPATIBILITIES

NOTICE TO EXISTING CUSTOMERS:

NEC Sphere will no longer supply versions of firmware for third-party devices with our software updates. Please use this guide to check for the compatible version of software and obtain it from the manufacturer's web site. See additional cautions in the Upgrade Manual for backing up these resources on your system.

Table .8 Hardware & Software Supported with v7.0.1

Hardware/Component	Spherical v7.0.1 Software Supports
Aastra 480i IP Phone	Aastra MGCP firmware version: 1.0.3.1010 + Boot ROM v1.1.0.4
Aastra SIP phones 9112i, 9133i	Aastra SIP firmware version: 9112i Generic SIP Firmware 1.4.3.23 (9112i.st) 9133i Generic SIP Firmware 1.4.3.23 (9133i.st)
480i 480i CT	480i Generic SIP Firmware 1.4.3.23 (480i.st) 480i CT Generic SIP Firmware 1.4.3.23 (480i Cordless.st)

SPHERICALL V7.0.1 SYSTEM REQUIREMENTS

System Hardware & Software Compatibilities

Hardware/Component	<u>Sphericall v7.0.1 Software Supports</u>
<p>AudioCodes MP-11X MP-112, MP-114, MP-118</p>	<p>AudioCodes MP104 SIP-only FXO Gateways firmware version: 4.60A.036.005</p> <p>AudioCodes MP11x SIP FXO Gateways firmware version: 4.80A.032</p> <p>NOTICE: Sphericall systems <i>only</i> support AudioCodes SIP devices. Transitioning to SIP prior to an upgrade is recommended.</p>
<p>Eutectics IPP200</p> <p><i>Currently does not support 64-bit OS.</i></p>	<p>Eutectics IPP200 with or without on/off hook Eutectics IPP520 EUSBi2c.inf no version information, modified date is 12/23/2003 EUSBi2c.sys, version 1.1.0.2004</p>
<p>Grandstream GXP2000/GXV3000</p>	<ul style="list-style-type: none"> • Grandstream GXP2000 SIP version: 1.2.1.4 • Grandstream GXV3000 SIP version: 1.1.3.29
<p>IBM Foundations Software</p>	<ul style="list-style-type: none"> • See Sphericall for Foundations System Requirements for details.
<p>Microsoft Exchange Unified Messaging Server</p>	<p>Microsoft Exchange Server 2007 SP1 The Sphericall system does not support Sphericall Voice Mail (unified messaging system) and the Exchange 2007 UMS Voice Mail solution running on the same system (you must choose only one UMS system).</p>
<p>Microsoft Office Communications</p>	<ul style="list-style-type: none"> • Microsoft Office Communications Server 2007 Standard or Enterprise Edition 3.0.6362.90. • Mediation Server: Microsoft Office Communications Server 2007 2.0.6.362.92 or later • Microsoft Office Communicator 2007 2.0.6362.0 or later (Note: After applying the update program of MOC, if a call between MOCs is transferred to another extension, an error occurs. This error has been detected with MOC version 2.0.6362.96 and version 2.0.6362.111. This error occurs not only in SIP Trunk functionality but also in the environment of OCS and MOCs only.) (English, Japanese languages supported)
<p>Microsoft® Windows® Installer</p>	<p>Microsoft® Windows® Installer 2, 3.0, 3.1 and 4.0.6000.16386 MSI/Group Policy application installation and configuration service</p>
<p>NEC Sphere Hardware</p>	<ul style="list-style-type: none"> • BH1830 • CH2430 • MH6030 • PB2430 <p>Notice to Sphericall users with ATM networks: Sphericall v5+ software products can be installed on ATM based Sphere systems with the noted caveats. The following features are not supported over ATM based systems, including hybrid Ethernet and ATM systems. These features are IP centric in nature and have not been certified for general use with VoATM.</p> <p>Not Supported:</p> <ul style="list-style-type: none"> • SIP trunking • Sphericall Call Recording • Sphericall Call Admission Control • Media Server based MoH • NEC Sphere Meeting Hubs <p>Limited Support:</p> <ul style="list-style-type: none"> • Sphericall Desktop Softphones (up to 10 for evaluation purposes) • IP Phones (up to 10 for evaluation purposes) • Sphericall Voice Mail (up to 10 users for evaluation purposes)

Hardware/Component	<u>Sphericall v7.0.1 Software Supports</u>
<p>NEC Sphere Software All versions in this release of software, must match the following:</p>	<ul style="list-style-type: none"> • Admin.exe 7.0.1.219 • CAC.exe 7.0.1.219 • CallLogger.exe 7.0.1.219 • Database 7.0.52.220 • Dbserver.exe 7.0.1.219 • DesktopManager.exe 7.0.1.219 • MediaServer.exe 7.0.1.219 • MG version 7.0.0.1 • MGC.exe 7.0.1.219 • Phone.exe 7.0.1.219 • SMDIservice.exe 7.0.1.219 • Sphericall.exe 7.0.1.219 • Tftpserver.exe 7.0.1.219 • WebServer.exe 7.0.1.219
<p>NEC UNIVERGE DT700 Phone Series</p>	<p>NEC Std SIP IP Phone Version 1.0.6.30</p> <ul style="list-style-type: none"> • DT710 ITL-2E • DT710 ITL-6DE • DT730 ITL-12D • DT730 ITL-24D • DT730 ITL-32D
<p>Plantronics</p>	<p>CS50-USB Wireless Headset System (softphone)</p> <ul style="list-style-type: none"> • Base firmware version of 5.2.7 • Remote firmware version of 2.8
<p>Polycom MGCP phones</p>	<p>Polycom MGCP SoundPoint L Series and firmware ap2.2.1.0018 BootROM 3.2.3B (IP300/500 SPIP 2.1.3) IP300 (220011340001) or IP301 (220011341001) IP500 (220011540001) or IP501 (220011541001) IP600 (220011640001) or IP601 (220011641001) Note: systems that are upgrading with Polycom phones must follow the procedure for firmware/boot ROM upgrade outlined in the Upgrade document.</p> <p>MANUFACTURER END OF LIFE NOTICE FROM POLYCOM ON ALL THE PRODUCTS LISTED ABOVE. These units may have limited functionality and support with future Sphericall releases. Refer to Technical Bulletin 125 for upgrade procedures.</p>
<p>Polycom SIP phones</p>	<p>Polycom SIP SoundPoint or Station series firmware SPIP 3.1.3.0439 BootRom: 4.1.3.0052:</p> <ul style="list-style-type: none"> • SoundPoint other platforms—IP301/501/601 • SoundStation IP4000 • VVX 1500 (phone with video screen) Bootrom: 4.1.3.0054 <p>Polycom SoundPoint series firmware SPIP 3.2.0.0157 Bootrom: 4.2.0.0310</p> <ul style="list-style-type: none"> • IP320, IP321, IP330, IP331 • SoundPoint IP430, IP450, IP550, IP560, IP650 + expansion module, IP670 • SoundStation IP 6000, and IP 7000 (conferencing) <p>Note: SIP phones may ship with a different version of firmware. Upon installation of Sphericall, the phones will install the approved firmware. Note: Polycom IP320 and IP330 (firmware SPIP2.1.3) have received end of life notices from Polycom. These units may have limited functionality and support with future Sphericall releases. Refer to Technical Bulletin 125 for upgrade procedures.</p>

SPHERICALL V7.0.1 SYSTEM REQUIREMENTS

System Hardware & Software Compatibilities

Hardware/Component	<u>Spherically v7.0.1 Software Supports</u>
Polycom Video Solutions	<p><u>Polycom SIP HD Video Conferencing</u></p> <ul style="list-style-type: none"> • HDX 4000 2.5.0.2-3395 • HDX 7000 2.5.0.2-3395 <p><u>Video Multipoint Control Unit (MCU)</u></p> <ul style="list-style-type: none"> • Polycom RMX 2000 RMX_4.0.1.29
Quintum	<p>Nonsurvivable firmware version: P105-19-05 Survivable firmware version: S106-06-02 Quintum Configuration Manager: 106-07-00</p> <p><u>Trunk Gateways</u></p> <ul style="list-style-type: none"> • AFT200/400/800 <p><u>Station Gateways</u></p> <ul style="list-style-type: none"> • AFG200/400/800 <p><u>Combination Gateways</u></p> <ul style="list-style-type: none"> • AFE400/600 • AFM200/400 <p>Note: Aastra MGCP phones do not support RFC2833, making them incompatible with the Quintum gateways.</p> <p>Note: Survivable gateway operations are <u>only</u> supported by Polycom SIP phones.</p>
Teledex	<p><u>Teledex SIP Phone</u></p> <ul style="list-style-type: none"> • iPhone ND2200 - 1.12.04
Telematrix	<p><u>Telematrix IP Phone</u></p> <ul style="list-style-type: none"> • Marquis 3300IP Phone - 1.7.256.257 • Telematrix Marquis 9600IP phone - 1.7.256.257
Unidata	<p><u>WPU-7700 SIP Phone</u></p> <ul style="list-style-type: none"> • WPU-7700 (US version) - v2.4.0 • WPU-7700 (Japan version) - v3.3.0
<p><u>SIP Phone Compatibility Note</u></p> <ul style="list-style-type: none"> • SIP phone compatibility with the Spherically Desktop may vary by phone. Refer to the Spherically phone summary spreadsheet details for specifics by telephone. 	

SIP FEATURE LIMITATIONS

Refer to the following table for a list of current feature differences when utilizing SIP or SIP devices with the Spherical system.

Table .9 SIP feature differences

System Feature/Component	Feature differences when using SIP
Failed Call Announcement	<ul style="list-style-type: none"> Currently does not support failed call announcements for any SIP endpoints.
Failover	<ul style="list-style-type: none"> The failover mechanisms for SIP devices are different than with MGCP devices or NEC Sphere media gateways. Specific protocols for establishing this failover capability are indicated in <i>Book Four</i>.
Call Park	<ul style="list-style-type: none"> Calls cannot be parked to a SIP station that is set to do not disturb.
Precedence calls from SIP phones	<ul style="list-style-type: none"> Precedence calls from SIP phones are not supported.
Queuing	<ul style="list-style-type: none"> Once a SIP station has entered a Queue, there is no method for that user to “zero out” of waiting in the Queue.
Quintum	<ul style="list-style-type: none"> Some Star Codes are supported on Quintum. Those that are not supported are listed in the Feature Specifications. Devices using Star Codes on a Quintum device may not hear standard “confirmation” tones (short burst tone) after entering the Star Code. On these systems, the confirmation tone will sound like “ringback” tone.
Polycom HDX Series	<ul style="list-style-type: none"> There are situations where the Polycom HDX fails to re-register with Spherical. Workaround: Restarting the device on a daily basis, or when needed, will re-register the Polycom HDX with Spherical.
Polycom RMX	<ul style="list-style-type: none"> Currently does not support the feature of Park of another Station on the RMX. System configurations must be designed so that the RMX is displayed in the system as a Conference Bridge with Conference addresses assigned to it prevents the ability of Parking to the RMX. Support for transfers to the Polycom RMX 2000 requires that either A) All SIP transferors support refer-based transfers (ex: Polycom SIP phones support refer-based transfer) or B) the transferor is a non-SIP endpoint. When there is an <i>attended</i> transfer of an audio/video call to the Polycom RMX 2000 from an audio only device (attendant) the RMX 2000 will only support the audio portion of that connection. Use of the <i>blind</i> transfer feature avoids this issue. The Polycom RMX only supports the audio portion of dual-mode conference calls. For example, if a conference call is made to the RMX 2000 using the Spherical Desktop for video and an MGCP phone for audio (dual-mode) only the audio portion of that call will be supported. Video functions with the Spherical Softphone device. Video conferencing will function only if all parties dial into the RMX 2000. If a Polycom RMX 2000 call is transferred to Spherical Voice Mail, the call may not disconnect. This may result in a lengthy voice mail message.

System Feature/Component	Feature differences when using SIP
<p>Spherical Desktop integration with SIP phone(s)</p>	<ul style="list-style-type: none"> • Spherical Desktop supports several models of SIP phones. • To cross-reference feature interactions, please refer to the NEC Sphere Phone Matrix for detailed notes and limitations. • To refer to further features available via keypad, refer to the System Star Code List. • SIP phones cannot be used in dual mode format (USB devices), which allows concurrent softphone and desk telephone set media switching operating mode. • The Call Waiting tone with the SIP phone and Spherical Desktop combination is not configurable by the user. • Video is not available with a SIP phone and the Spherical Desktop. • A 3-party conference must be initiated through the softkey feature on an IP telephone set. A 3-party conference cannot be initiated through the Spherical Desktop controlling a SIP phone endpoint. • A 3-party video conference hosted by a "split media" endpoint is not supported. When a party is disconnected from the host, the host may experience unexpected video behavior. Putting the call on hold and then taking the call off hold should correct the video behavior (split media is defined as audio-to-phone and video-to-desktop on the PC). • An Attended Transfer must be placed on Hold first, then transferred, when working with a SIP phone. • Analog phones that are connected to the Spherical system via a SIP gateway (Quintum) are limited by the SIP gateway to the Spherical SIP feature limitations.
<p>Star Codes, Passwords</p>	<ul style="list-style-type: none"> • SIP Star codes are supported, but in some cases may be unique compared to analog or MGCP phone star codes. Refer to the System Star Codes document.
<p>SIP Trunking</p>	<ul style="list-style-type: none"> • Split media is a use case where an analog or MGCP phone is used for the voice portion and the Spherical Desktop is used for the video portion of the call. Split media is only supported between devices on the same system. Use of split media between systems (i.e. using a tie line SIP trunk) is not supported.
<p>Voice Mail Callback</p>	<p>In a SIP device environment, VM callback does not work under any of the following conditions and the feature should be disabled in General System Properties/Media Server if they exist:</p> <ul style="list-style-type: none"> • Telephony areas outside of North America (#1961) • AudioCodes endpoints FXO or FXS (#1931) • All SIP endpoints stations or trunks <p>This feature is disabled by default to prevent inadvertent use.</p>

Table .10 SIP Standards

Protocol	Session Initiation Protocol	Standards Utilized by Sphericall	
SIP Stations	<ul style="list-style-type: none"> • RFC2833 • RFC3261 • RFC3262 • RFC3263 • RFC3264 • RFC3265 	<ul style="list-style-type: none"> • RFC3311 • RFC3325 • RFC3326 • RFC3428 • RFC3515 • RFC3581 • RFC3665 	<ul style="list-style-type: none"> • RFC3725 • RFC3842 • RFC3891 • RFC4028 • RFC4411 • RFC4412
SIP Trunking	Session Initiation Protocol - The core standards document for SIP trunking is RFC3261. Originally defined in RFC2543, the current standard is contained largely in RFC3261 and RFCs 3262-3265.		
MGCP	Media Gateway Control Protocol - v1.0		

VOIP NETWORKING

Table .11 VoIP Network Requirements

VoIP Networking Core Issues	Requirements, Options, and Exclusions	Failure to Comply Causes:
<p>Ethernet Speed and Duplex Settings</p> <p>Comply: Yes/No: _____</p>	<p>Requirements:</p> <ul style="list-style-type: none"> • If one end of the link is set to auto-negotiate, the other end of the link MUST also be set to auto-negotiate. • If there is a need to use manual settings (e.g. connecting to a 10 Base-T only switch that is capable of Full Duplex), make sure that both ends of the link are manually configured to the same setting. DO NOT manually configure one end of the link and leave the other end set to auto-negotiate. <p>Options: n/a Exclusions: n/a Recommendations:</p> <ul style="list-style-type: none"> • Use auto-negotiation whenever possible. • To view the Ethernet link settings on the MG, type “<code>edd status</code>” at the CLI prompt. 	<ul style="list-style-type: none"> • one-way media streams • poor voice quality • dropped packets

VoIP Networking Core Issues	Requirements, Options, and Exclusions	Failure to Comply Causes:
<p>Low Bandwidth Links</p> <p>Note: For best voice quality, all network designs which include WAN connections must be reviewed by the local Sphericall System Engineer.</p> <p>Comply: Yes/No: _____</p>	<p>Requirements:</p> <ul style="list-style-type: none"> • Inter-switch links must be provisioned to meet the projected bandwidth requirements of a converged voice data network segment. • The sizing of these links must take into account, but not be limited to, data nodes per segment, average and peak traffic, average and peak broadcast traffic. <p>Generally: G.711 = 85 Kbps; G.729 = 34 Kbps per call.</p> <p>Note: At layer 3, IP bandwidth is equal to 80 Kbps.</p> <p>Options: n/a Exclusions: n/a</p> <p>Recommendations:</p> <ul style="list-style-type: none"> • Configure WAN interfaces to provide priority queuing for RTP traffic. For example, Cisco IOS provides an RTP priority queuing capability with the "IP RTP Priority" feature. ("ip rtp priority" or "frame-relay ip rtp priority") <p>On point-to-point links use RTP header compression (cRTP). ("ip rtp header-compression" or "frame-relay ip rtp header-compression")</p> <p>Note: cRTP can ONLY be used with point-to-point connections or in a completely private network in which all devices support cRTP.</p> <ul style="list-style-type: none"> • On low bandwidth links less than 512 Kbps, configure WAN interfaces to fragment large packets to avoid unnecessary serialization delay. ("frame-relay fragment [size in bytes]" in conjunction with "map-class frame-relay") 	<ul style="list-style-type: none"> • poor voice quality • dropped packets • failure of calls to connect • latency
<p>Network Performance Characteristics</p> <p>Comply: Yes/No: _____</p>	<p>Requirements:</p> <ul style="list-style-type: none"> • Maximum round trip latency: 150 ms • Throughput/packet loss: Less than or equal to 0.1 percent • Jitter: ± 10 ms <p>Options: n/a Exclusions: n/a</p>	<ul style="list-style-type: none"> • dropped packets • latency

VoIP Networking Core Issues	Requirements, Options, and Exclusions	Failure to Comply Causes:
<p>Switch</p> <p>Comply: Yes/No: _____</p>	<p>Requirements:</p> <ul style="list-style-type: none"> Support 802.3 AC Ethernet Frame Extension. Physically non-blocking (this does not mean statistically non-blocking). A physically non-blocking switch is one which possesses backplane memory sufficient enough to accommodate all ports forwarding traffic at full line rate full duplex without packets being dropped or "blocked." Minimum: Switch must be Internet Group Management Protocol version 2 (IGMPv2) capable. Similarly, when forwarding multicast traffic, the switch must not introduce additional latency or allow packets to be lost in the forwarded stream. Switch must be able to forward packets at line rate. Switch must be common prioritization scheme capable. At a minimum, the switch MAC tables must be large enough to hold an entry for each MG and each MGC, plus a certain number of entries for other network devices such as routers. <p>Options: n/a Exclusions:</p> <ul style="list-style-type: none"> The use of hubs with the Spherical system is NOT permitted. <p>Note: Review your switch documentation carefully to verify there are no preprogrammed/proprietary ports (VLANs) configured on the switch. These ports will not function correctly with the Spherical system.</p>	<ul style="list-style-type: none"> dropped packet one-way media stream MG to MGC connection issues MG & IP phone devices unable to connect
<p>Traffic</p> <p>Comply: Yes/No: _____</p>	<p>Requirements:</p> <ul style="list-style-type: none"> The necessary bandwidth must be available to support voice and data during the organization's busy hour. Total bandwidth utilization during the voice/data busy hour(s) must be less than 100% in order to avoid degradation of voice quality and call blocking. In order for the network to support maximum bandwidth utilization, the switches and routers must forward packets at line rate regardless of the % of bandwidth utilization. In addition, the switches must deliver the necessary prioritization tags and queuing to support the ability of the network to prioritize voice during times of heavy bandwidth utilization. In order to design the system appropriately, the system engineer must have an intimate knowledge of all network attached applications and their affect on bandwidth availability during busy hour(s). For instance, "chatty" applications such as Citrix and ERP packages must be accounted for when determining bandwidth available for voice. <p>Options:</p> <ul style="list-style-type: none"> With proper prioritization, traffic bursts may exceed 100% bandwidth utilization. <p>Exclusions: n/a</p>	<ul style="list-style-type: none"> intermittent one-way media streams, during busy hours packets dropped distortion
<p>VLAN Configuration</p> <p>Comply: Yes/No: _____</p>	<p>Requirements: n/a Options: n/a Exclusions: n/a Recommendations:</p> <ul style="list-style-type: none"> If the network is configured to assign traffic priorities based upon VLAN ID, it is highly recommended that the MGC is in the same VLAN as the MGs. This ensures call control traffic will also have high priority. If the network is configured to assign traffic priorities based upon MAC or IP address, the MGC can be in a different VLAN than the MGs, but the call control traffic should be assigned high priority. <p>Network Design Consideration: Whenever possible, voice traffic should be logically separated from data traffic by installing all NEC Sphere MGs and MGCs on one or more voice VLANs. However, the partitioning of voice and data traffic must not be restrictive to data requiring routing among these logical separations. Routing must be enabled between voice and data VLANs to allow the Spherical Desktop to function.</p>	<ul style="list-style-type: none"> delayed call setup Spherical Desktop synchronization problems

MICROSOFT PERMISSIONS

Table .12 Login & Permission Requirements

Account Log- ins/Group Needed:	Minimum Permissions Required: (all are listed in order of installation requirement)	Account Creation:
The following are the minimum permissions required for installing and/or administering Sphericall. Those accounts that do not exist prior to installation in some cases may be created during the installation and may require the Domain Admin to grant approval.		
<p>SphereSupport (account created to install and manage Sphericall Manager)</p> <p style="text-align: center;"><i>See Active Directory User Accounts Notes Below</i></p>	<p>Minimum: MUST be a member of the Local Machine Admin Group</p> <ul style="list-style-type: none"> • Used for installing Sphericall Manager Local Administrative Rights - Groups\Administrators Local Security Access - “Act as part of the operating system” required. • Used for commissioning Exchange for Sphericall Voice Mail. <p style="text-align: center;">-----Recommended: Required for Adding Users on the Domain-----</p> <p>Every Sphericall user must also have an Active Directory user account (required for voice mail, desktop, password authentication, web services on SIP phone).</p> <ul style="list-style-type: none"> • SMALL SITES: SphereSupport account (or the user’s actual login) must be a member of the Domain Admins Group. • LARGE SITES: SphereSupport account (or the users’ with actual logins) must be given rights to create Domain Users or to add users to the Organizational Unit. <p style="text-align: center;">-----Required for Sphericall Voice Mail-----</p> <p>The Media Server supporting Voice Mail uses an Active Directory user account for all users to lookup the user’s Exchange mailbox.</p> <p>SphereSupport (or user account login) Must have an Exchange Mailbox</p> <p>Forms Owner (for unified messaging integrations)</p> <ul style="list-style-type: none"> • Used on the Exchange server for Sphericall Voice Mail forms. <p>Exchange 2007 requires an Active Directory setting</p> <ul style="list-style-type: none"> • SphereSupport account must be a member of the Exchange Security Groups: Exchange Public Folder Administrators. <p style="text-align: center;">-----</p> <ul style="list-style-type: none"> • SphereSupport or any user acting as the Sphericall Administrator must have a Password as well as Sphericall Administrator status enabled in User Rights. This same Password is used for administering Sphericall Media Server, Auto Attendant and Queuing via the hidden menu option in the Voice Mail Menu Options. 	<ol style="list-style-type: none"> 1. Created <u>manually</u> on the Domain or must have Domain Admin present during installation or upgrade(s) 2. Created <u>manually</u> on the local machine 3. Created <u>manually</u> in Active Directory by the Domain Administrator. <p style="text-align: center;">-----</p> <ol style="list-style-type: none"> 4. Must have Domain Admin present during installation or upgrade(s) 5. AND, must be manually added to the Sphericall Admins Group

Account Log- ins/Group Needed:	Minimum Permissions Required: (all are listed in order of installation requirement)	Account Creation:
<p>The following are the minimum permissions required for installing and/or administering Spherical. Those accounts that do not exist prior to installation in some cases may be created during the installation and may require the Domain Admin to grant approval.</p>		
<p>Spherical Admins (security group)</p>	<p>Domain Group - created as a Global Security Group</p> <ul style="list-style-type: none"> Used for installing Spherical Manager. Sphere-DB and Sphere-MS user accounts are members of this group. Used for commissioning Exchange for Spherical Voice Mail. Used for Database replication (for access to the Spherical share on the Primary Spherical Manager). Also used for any Media Server related features: Music on Hold, Auto Attendant, Voice Mail, Queuing, Call Recording, etc. During installation a network share is created on the Program Files\Sphere folder on both the Primary and any Secondary Managers; Spherical Admins group has full rights to that folder. <p>-----</p> <p>Recommended: NEC recommends that you add the SphereSupport (or the actual user's login) account to this group.</p>	<p>Created <u>automatically</u> by the Spherical system, on the Domain, during Spherical installation.</p> <p>NEW: Automatically added to the Local Admins group on the Spherical Manager.</p>
<p>Spherical Recording (security group)</p>	<p>Domain Group - created as a Global Security Group</p> <ul style="list-style-type: none"> Created during commissioning. Sphere-DB and Sphere-MS user accounts are members of this group. This group is given security and share permissions to all recording directory shares. This default directory does not inherit permissions from the parent directory: Program Files\Sphere\MediaServer\CallRecordings. 	<p>Created <u>automatically</u> by the Spherical system, on the Domain, during Spherical installation.</p>
<p>SPHERE-DB (account) <i>See Active Directory User Accounts Notes Below</i></p>	<p>User is part of the <Domain name>\Spherical Admins Group and Spherical Recording Group</p> <ul style="list-style-type: none"> Used to write to database for database replication. Used by the Spherical Desktop to retrieve call recordings. <p>Note: The Sphere-DB account may be created by the Domain Administrator prior to Spherical system installation, and if so created, the Spherical system will simply verify it during installation. Sphere-DB account MUST be set for: "User cannot change password" and "Password never expires."</p>	<p>Automatically created on the Domain during Spherical Manager installation; must have Domain Admin present during installation or upgrade(s).</p>
<p>SPHERE-MS (account) <i>See Active Directory User Accounts Notes Below</i></p>	<p>User is part of the <Domain name>\Spherical Admins Group and Spherical Recording Group</p> <p>Used primarily for media servers. Also used for connecting Spherical to Exchange for Spherical Voice Mail.</p> <ul style="list-style-type: none"> WARNING: Please refer to information later in this document about Windows Server 2003 SP1 related to Sphere-MS permission on the Exchange server requirements. If Exchange server is also the Domain/Active Directory server, Sphere-MS account must be a part of <domain>\Administrators group. <p>Note: The Sphere-MS account may be created by the Domain Administrator prior to Spherical system installation, and if so created, the Spherical system will simply verify it during installation. Sphere-MS account MUST be set for: "User cannot change password" and "Password never expires."</p>	<p>Automatically created on the Domain during Spherical Manager installation; must have Domain Admin present during installation or upgrade(s).</p> <p>Automatically added to the Local Admins group on the Spherical Manager.</p>

Account Log- ins/Group Needed:	Minimum Permissions Required: (all are listed in order of installation requirement)	Account Creation:
<p>The following are the minimum permissions required for installing and/or administering Spherical. Those accounts that do not exist prior to installation in some cases may be created during the installation and may require the Domain Admin to grant approval.</p>		
<p>Spherical Administrator (Remote user)</p> <p>Spherical AA & Media Server Admin Rights</p>	<p>Spherical Administrator - Remote or Local Minimum: MUST be a member of the Local Machine Admin Group</p> <ul style="list-style-type: none"> Used for installing Spherical Manager Local Administrative Rights - Groups\Administrators User must be appointed Spherical Administrator under Spherical User Rights. User must have both Spherical Administrator user rights PLUS a Password for administering Spherical Media Server Prompts and Queuing Announcements via the hidden menu option in the Media Server Administration Menu Options. 	<p>Manually on Remote Admin PC for Spherical Administration application</p> <p>Manually on Spherical Administrator User Rights for Spherical application only</p>
<p>Spherical Desktop Users</p>	<p>Must be a member of Local Machine Admin Group OR a Power User</p> <ul style="list-style-type: none"> Used to install Spherical Desktop. Used to install Spherical Voice Mail forms with Outlook Client for unified messaging. Used by Desktop Manager for automatic client upgrades. All Spherical Desktop Users <u>must have Active Directory User Account</u> (credentials) in order to use Spherical Desktop. <p>NOTE: Windows users that will be accessing recordings using the credentials of the SPHERE-DB user are required to be members of the Local Security Policy "Act as part of the operating system."</p>	<p>Manually on a Domain or on the local machine</p>

Table .13 Third-party and other important passwords or permissions required

Account Log- ins/Group Needed:	Minimum Permissions Required:	Account Creation:
<p>Group Policy</p>	<p>Support for Microsoft Windows Installer and Group Policy Snap-in for installing, updating or uninstalling Spherical Desktop or Spherical Desktop Softphone clients. See Microsoft product documentation for full permission information.</p>	<p>Domain Administrator permissions required for Group Policy Administration</p>

Account Log- ins/Group Needed:	Minimum Permissions Required:	Account Creation:
<p>FTP Server FTProot Directory</p>	<p>Organizations using a separate FTP server must do the following:</p> <ul style="list-style-type: none"> • Copy the FTProot directory from the Spherically Manager to the FTP Server. • Grant FULL CONTROL Security access to the FTProot directory, based on the type of phone(s) you are using (i.e. if using SoundPoint IP phones, you must create that account; if using Aastra 480i phones, you must create that account; if using both, you must create both accounts). <p>Required Folder(s): If you are installing Windows FTP server, the ftproot folder will be located by default at: c:\inetpub\ftproot. This default setting needs to be changed as follows:</p> <ul style="list-style-type: none"> • For systems with the FTP Server on the Primary Spherically Manager, the following folder is required for the location of IP phone resource files: <drive>:\Program Files\Sphere\ftproot • For systems with the FTP Server on any other server (third-party or Secondary Spherically Manager), the following folder is required for the location of IP phone resource files: <drive>:\ftproot\ 	<p>See below based on manufacturer</p>
<p>Aastra 480i: Used for IP phones</p> <p>Aastra480i</p> <p><i>See Active Directory User Accounts Notes Below</i></p> <p>Aastra SIP 9112i & 9133i IP Phone</p>	<p>Aastra 480i FTP login: <i>Login: Sayson; Password: Aastra480i</i> Either of the following two: 1. Must be a Domain User if FTP server is also the Domain/Active Directory server. 2. Local User if on the FTP server and FTP server is not the Domain/Active Directory server. Create a user account with username Sayson; create password: Aastra480i</p> <p>Default Administrative Passcode on 480i phone: 22222 Configurable Administrative Passcode on 480i phone only (not web interface): 1) Options 2) Option #9 - MGCP Settings 3) Option #9 - Admin Password</p> <p>Administrative Passcode & web interface login on 480i phones: Login: admin Password: 22222</p> <p>Default Administrative Passcode on 9112i and 9133i phone: 22222</p> <p>Administrative Passcode & web interface login on 9112i and 9133i phones: Login: admin Password: 22222</p>	<p>Manually on a Domain or on the FTP server</p> <p>Entered manually on the phone</p> <p>Entered manually on the web interface</p> <p>Entered manually on the phone Entered manually on the web interface</p>
<p>Grandstream BT series & GXP2000</p>	<p>Default administrative password: admin</p>	<p>Entered manually on the web interface</p>

Account Log- ins/Group Needed:	Minimum Permissions Required:	Account Creation:
<p>Polycom: Used for IP phones</p> <p>PlcmSpIp (case sensitive)</p> <p><i>See Active Directory User Accounts Notes Below</i></p>	<p>Login & Password: PlcmSpIp (case sensitive) Either of the following two:</p> <ol style="list-style-type: none"> PlcmSpIp Must be a Domain User if FTP server is also the Domain/Active Directory server. PlcmSpIp Local User if on the FTP server and FTP server is not the Domain/Active Directory. Create a user account with username PlcmSpIp; create password PlcmSpIp <p>Administrative Passcode on the Polycom SoundPoint IP phone and SoundStation 4000 IP Conference Phone: 456</p> <p>RMX: User Name: SUPPORT Password: SUPPORT</p> <p>HDX: User Name: admin Password: <use the serial number of the device></p> <p>Password Complexity Guidelines with Polycom</p> <ul style="list-style-type: none"> If the FTP server is on the Active Directory server (Ex. Spherical all-in-one servers), then the Polycom user account must be a domain user account that meets the domain Password Complexity requirements. If the FTP server is on anything other than the Active Directory server (recommended on a Spherical Manager), then the Polycom user account permissions are not required to meet Password Complexity, since it is a local account rather than a domain account. 	<p>Manually on a Domain or on the FTP server</p> <p>Entered manually on the phone</p>
<p>Quintum SSG</p>	<p>Username: admin Password: admin</p>	
<p>NEC Sphere Media Gateways</p>	<p>To manually configure the ip address of the device through the serial cable by hyperterminal, the following password is required:</p> <ul style="list-style-type: none"> private The default community name for SNMP access write is private. The default community name for SNMP access read is public. 	<p>Manually entered via hyperterminal</p>
<p>Teledex</p>	<p>User Name: Admin Password: iPhone06</p>	<p>Manually entered</p>
<p>TeleMatrix</p>	<p>User Name: Admin Password: Admin</p>	<p>Manually entered</p>
<p>Unidata</p>	<p>Admin Password: 000000</p>	<p>Manually entered</p>

Active Directory User Accounts:

- Sphere-MS & Sphere-DB Accounts MUST be set for: "User cannot change password" and "Password never expires".
- Microsoft Password Complexity (affecting IP phones, Sphere-DB and Sphere-MS passwords):
Any new build of Windows 2003 or 2008 Domain/Active Directory server (versus Windows Domain/Active Directory that has been upgraded) by default enables password complexity. Default passwords for IP phones do not satisfy the complexity requirement. It is recommended that password complexity be disabled at the domain level on Windows 2003 or 2008 Domain/Active Directory.
- Options:**
An alternative solution to disabling password complexity on the Windows 2003 or 2008 Domain/Active Directory would be to redefine the password on all IP phones. Redefining the password on all IP phones also requires that you redefine the password on the Spherical Administrator-> System - View Properties -> IP Phones tab.

WINDOWS & IP NETWORKING REQUIREMENTS

Windows & IP Net- working Core Issues	Requirements, Options, and Exclusions	Failure to Comply Causes:
<p>Active Directory server (formerly Domain Controllers) Windows 2003 Password Complexity</p>	<p>Recommendations:</p> <ul style="list-style-type: none"> New installations of Windows 2003 or 2008 Active Directory server by default enable password complexity. Default passwords for IP phones do not satisfy the complexity requirement. It is recommended that password complexity be disabled at the domain level on new Windows 2003 or 2008 Active Directory servers. <p>Requirements: n/a</p> <p>Options:</p> <ul style="list-style-type: none"> An alternative solution to disabling password complexity on the Windows 2003 or 2008 Active Directory would be to redefine the password on all Polycom Sound-Point IP phones. Redefining the password on all IP phones also requires that you redefine the password on the Spherical Administrator-> System - View Properties -> IP Phones tab. <p>Exclusions: n/a</p>	<ul style="list-style-type: none"> IP phones will not check in; firm-ware image not downloaded
<p>DHCP (see also Static vs. Dynamic IP Addresses)</p>	<p>If you are using DHCP for IP phones, it is a requirement to use ONE of the following:</p> <p>Requirements:</p> <ul style="list-style-type: none"> One DHCP server per subnet. Only required if using dynamic assignment of IP addresses. Assign leases that do not expire. Set Conflict Resolution to "ON". Use Reservations. <p>Options: (in order of preference)</p> <ol style="list-style-type: none"> DHCP relay agent on router. DHCP relay agent on a Windows server. DHCP on Secondary Spherical Manager to assign IP address to Spherical devices ONLY. <p>Exclusions:</p> <ul style="list-style-type: none"> Do not implement using overlapping scopes. 	<ul style="list-style-type: none"> Phones, MGs will not check-in May drop off of network when lease expires
<p>FTP Server on the network</p> <p>NEW --></p>	<p>Option: Those Spherical systems incorporating IP phones in their design will require an FTP server on their network.</p> <p>Recommendation: FTP Server running on the Primary Spherical Manager is the recommended location for optimal use and upgradability. Reminder: While it is possible to run the FTP Server on the Primary Spherical Manager, both the FTP server and DbServer are under greatest loads during check-in.</p> <p>Windows 2008 server requires changes to the method of configuring the FTP server. Please see Book 4 appendix for configuration.</p>	
<p>IP ADDRESSES: Reserved Default IP Addresses Used in System</p>	<p>Server based Music-on-Hold - Default range = 239.192.0.0 - 239.192.255.255</p> <p>Multicast "Monitoring" Group IP Address - Default Initial address = 239.194.0.0</p> <p>Multicast Discovery IP Address - Default discovery = 239.193.0.0</p>	
<p>Multicast</p>	<p>Requirements:</p> <ul style="list-style-type: none"> Switches and routers must support IGMPv2. Switches and routers must be configured to forward multicast traffic for all devices in order to support MG/MGC discovery, Music-on-Hold capabilities, monitoring of any kind, presence, queuing etc. 	<ul style="list-style-type: none"> Features limited

Windows & IP Net- working Core Issues	Requirements, Options, and Exclusions	Failure to Comply Causes:
Network Address Translation	<p>Requirements: n/a</p> <p>Options:</p> <ul style="list-style-type: none"> • Layer 2 tunneling or other VPN mechanism may be used. <p>Exclusions:</p> <ul style="list-style-type: none"> • Network Address Translation (NAT) CANNOT be used. It does not allow the media streams to set up properly. 	<ul style="list-style-type: none"> • NAT will cause IP phones, MGs and Desktops not to function
Remote Administration Management	<p>Options:</p> <ul style="list-style-type: none"> • pcAnywhere 10.5+. • VNC • RDP in console mode. NOTE: Can only be run in console mode. Search for Remote Desktops administrative snap-in on the Microsoft site. 	
SNMP Network Manager Support	<p>Requirements:</p> <ul style="list-style-type: none"> • Network management software must support SNMP version 1 with an MIB2 to view all status and trap information. 	
Static vs. Dynamic IP Addresses (see also DHCP for dynamic addresses)	<p>Requirements:</p> <ul style="list-style-type: none"> • Static IP addresses for all Spherical Managers. <p>Options:</p> <ul style="list-style-type: none"> • The Spherical system supports the use of dynamic assignment of IP addresses for Spherical Desktops and MGs. Static addresses can be assigned if desired. <p>Exclusions:</p> <ul style="list-style-type: none"> • No dynamic addressing for Spherical Managers. This reduces reliability. <p>Recommendations:</p> <ul style="list-style-type: none"> • Static IP addresses may be used on selected workstations, such as the operator, for increased reliability. 	<ul style="list-style-type: none"> • reduced reliability of Spherical Manager(s)
Spherical MG Subnet Name	<p>Requirements:</p> <ul style="list-style-type: none"> • If an organization uses static IP addressees, the net name MUST be ether.home for ethernet devices. Ethernet devices named otherwise will not connect to the MGC. 	<ul style="list-style-type: none"> • devices will not function

TCP & UDP PORTS

Windows & IP Networking Core Issues	Requirements, Options & Exclusions	Failure to Comply Causes:
<p>NOTE: The following section has information for RPC, RTCP, TCP, UDP port Management.</p>		
<p>Some ports have the following classification to assist you with setting up network prioritization. If nothing else, please consider setting up these ports with the following prioritization:</p> <p>1. CC = Call Control ports requiring the highest prioritization</p> <p>2. MS = Media Stream ports requiring the next highest prioritization</p>		
<p>CAUTION: There is a CAUTION related to port assignments in the Release Notes. Refer to the Release Notes for further information.</p>		
<p>TCP Ports</p>	<p>Requirements: The following TCP ports are used by the Sphericall system under normal operation:</p> <ul style="list-style-type: none"> • 23 (0x0017) - Telnet for remote configuration of MGs • 135 (0x0087) - RPC directory service used to look up ports on which services are running • 1025-5000 - RPC communication utilizes ports in this range • CC 2000 (0x07D0) - TcpMgListener (MGC to MG for call control) • CC 2100 (0x0834) (unicast) - SphereNetCallControlPort (MGC to MGC communication) • CC 2200 (0x0898) - Call Admission Control Gatekeeper listens for incoming connections from the MGCs on TCP port 2200 • 4000-4003 - Ports to access performance counters (MGC, DBServer, Sphericall Service, Call Logger) • 6532 (0x1984) - Remote trace port to perform advanced diagnostics of MGs • 7000 (0x1B58) - Call logger request port (Sphericall Desktop applications send requests to this port to obtain information about call log entries for a particular user) <p>Desktop Manager & ClientUpdater Requirements:</p> <ul style="list-style-type: none"> • 3050 (0x0BEA) (unicast) - ClientUpdater sends requests to this port, which is the TCP port that the DesktopManager is listening of. ClientUpdater runs on each client machine that is running Sphericall Desktop. • 3051 (0x0BEB) (unicast) - DesktopManager sends messages on this port, which is the TCP port that the ClientUpdater is listening on. DesktopManager runs on the primary MGC server. <p>NEC SMDR tab on the Call Logger Process</p> <ul style="list-style-type: none"> • 60010 (0xEA6A)[Default port] - CallLogger receive port (SMDR Client apps send requests to this port to get the accounting information). The above-mentioned value (60010) can be changed [49152-65535] in the application in CallLogger service. <p>WebServer Requirements: Configured through the WebServer.xml configuration file.</p> <ul style="list-style-type: none"> • 80 (0x0050) - Used for HTTP to serve web pages to IP phones. • 443 (0x01BB) - Used for HTTP to serve web service SOAP requests. 	<p>Sphericall system performance may be affected by ports not opened for firewalls, routers, etc.</p>

Windows & IP Net- working Core Issues	Requirements, Options & Exclusions	Failure to Comply Causes:
<p>NOTE: The following section has information for RPC, RTCP, TCP, UDP port Management.</p> <p>Some ports have the following classification to assist you with setting up network prioritization. If nothing else, please consider setting up these ports with the following prioritization:</p> <p>1. CC = Call Control ports requiring the highest prioritization</p> <p>2. MS = Media Stream ports requiring the next highest prioritization</p> <p>CAUTION: There is a CAUTION related to port assignments in the Release Notes. Refer to the Release Notes for further information.</p>		
<p>UDP Ports</p> <p>CHANGE>>></p> <p>NEW>>></p>	<p>Spherical System UDP Requirements: The following UDP ports are used by the Spherical system under normal operation:</p> <ul style="list-style-type: none"> • 69 (0x0045) (unicast) - TFTP server port on MGC. • CTIP ports that are used to communicate with the MGC are dynamically assigned in the range of 1025-5000. • CC 2001 (0x07D1) (unicast & multicast) - TARP (Used by MGC to submit TARP requests to the network). • CC 2002 (0x07D2) (unicast) - TARP (Used to relay TARP queries). • TARP ports that are used to communicate with the MGC are dynamically assigned in the range of 1025-5000. • 5001 Windows 2003 Multicast UDP port default setting. Used for Multicast Address port assignment. NOTE: a port configured for multicast on the Spherical Administrator application must be in the range of 5001-49151. • 5001 Windows 2008 Multicast UDP port default setting. Used for Multicast Address port assignment. NOTE: a port configured for multicast on the Spherical Administrator application must be in the range of 5001-49151. • User Defined: Desktop uses multicast monitoring as defined on the Spherical Administrator. This is configured on a system by system basis. 	<p>Spherical system performance may be affected by ports not opened for firewalls, routers, etc.</p>
<p>UDP Ports <i>continued...</i></p>	<ul style="list-style-type: none"> • CC 2427 (0x097B) (unicast) - MGCP control (MGC to MGCP IP phone) • CC 2727 (0x0AA7) (unicast) - MGCP control (MGCP IP phone to MGC) • 3000 (0x0BB8) (unicast) - CTIP port (MGC port for Desktop Application) • 4001 (0x0FA1) (unicast) - CallLogger receive port (All MGCs send call log information to this port so that the call logger can receive it) • 5026 - DBServer - Database replication events; Sends to DBServer. • 5026 - DBServer - Sends to other addresses (MGC, Admin, Voice Mail) using this port. • 8000 - Spherical - Refresh report 	<p>Spherical system performance may be affected by ports not opened for firewalls, routers, etc.</p>
<p>UDP Ports <i>continued...</i></p>	<p>SIP</p> <ul style="list-style-type: none"> • CC 5060 (0x13C4) - UDP port is the standard port used by the MGC for all SIP traffic. <p>Important Note: When integrating with SIP, the customer may need to ask the SIP carrier for the media stream port utilization.</p>	<p>All SIP calls fail</p>
<p>UDP Ports <i>continued...</i></p>	<p>Desktop and Video UDP Requirements: The following UDP ports are used by the Spherical system under normal operation:</p> <ul style="list-style-type: none"> • 2002 (0x07D2) (unicast) - Desktop application sends TARP requests to port 2002. • MS 49410 (0xC102) (unicast) - Desktop application sends video on this port. • MS 49411 (0xC103) (unicast) - RTCP port associated with sending video. • MS 49424 & 49428 (unicast) - Desktop application receives video on these ports. • MS 49425 & 49429 (unicast) - Desktop application (RTCP port(s) associated with receiving video on the local machine.) 	<p>Spherical system performance may be affected by ports not opened for firewalls, routers, etc.</p>

Windows & IP Networking Core Issues	Requirements, Options & Exclusions	Failure to Comply Causes:
<p>NOTE: The following section has information for RPC, RTCP, TCP, UDP port Management.</p> <p>Some ports have the following classification to assist you with setting up network prioritization. If nothing else, please consider setting up these ports with the following prioritization:</p> <p>1. CC = Call Control ports requiring the highest prioritization</p> <p>2. MS = Media Stream ports requiring the next highest prioritization</p> <p>CAUTION: There is a CAUTION related to port assignments in the Release Notes. Refer to the Release Notes for further information.</p>		
<p>UDP Ports <i>continued...</i></p>	<p>Softphone UDP Requirements: The following UDP ports are used by the Sphericall system under normal operation:</p> <ul style="list-style-type: none"> • MS 49412 (0xC104), 49414 (0xC106) (unicast) - Sphericall Softphone sends and receives audio on each of these ports. Port 4914 is used when it is a 3 party conference. • MS 49413 (0xc105), 49415 (0xC107) (unicast) - Sphericall Softphone has 2 associated RTCP ports, one each port for control. 	<p>Sphericall system performance may be affected by ports not opened for firewalls, routers, etc.</p>
<p>UDP Ports <i>continued...</i></p> <ul style="list-style-type: none"> • Requirement 	<p>Sphericall Text Messaging UDP Requirements: The following UDP ports are used by the Sphericall system under normal operation:</p> <ul style="list-style-type: none"> • 5070 Desktop • 5060 MGC <p>Requirement:</p> <ul style="list-style-type: none"> • If the PC running Sphericall Desktop is a Windows Vista or XP machine, the Internet Connection Firewall will prevent text messaging and monitoring using the Sphericall Desktop via port 5070. Vista and XP Service Pack 2 enables Internet Connection Firewall by default, but once the Sphericall Desktop opens, a warning will pop up and allow the user to enable the necessary port(s). • Address Group CTIP Multicast addresses and/or Zone CTIP Multicast addresses must also have their ports enabled at the Internet Connection Firewall in order for monitoring or text messaging to operate. 	<p>Sphericall system performance may be affected by ports not opened for firewalls, routers, etc.</p>
<p>UDP Ports <i>continued...</i> Integrated Products</p>	<p>The following UDP ports are used by the Sphericall system under normal operation for the function of third-party products:</p> <p>Aastra IP phone UDP Requirements</p> <ul style="list-style-type: none"> • MS 49408-49413 - RTP/RTCP port for communication for Aastra 480i phones. • MS 3000-3007 - RTP/RTCP port for communication for Aastra SIP 9112i/9133i phones. <p>AudioCodes MP104 Analog Media Gateway UDP Requirements</p> <ul style="list-style-type: none"> • MS 49410, 49420, 49430, 49440 (unicast) - RTP/RTCP ports for communication with AudioCodes equipment (Ports begin with 49410 and equal the base address plus 10 times the number of channels). <p>Grandstream phone UDP Requirements (SIP)</p> <ul style="list-style-type: none"> • MS 5004-5007 - RTP/RTCP port for communication for BT-1XX phones. • MS 5004-5021 - RTP/RTCP port for communication for GXP-2XXX phones. <p>Polycom IP phone UDP Requirements</p> <ul style="list-style-type: none"> • MS 1056-1061 - RTP/RTCP port for communication for SoundPoint IP (MGCP) 301/501/600 phones. • MS 2222-2269 - RTP/RTCP port for communication for SoundStation (SIP) IP4000 phones. 	<p>Sphericall system performance may be affected by ports not opened for firewalls, routers, etc.</p>

Windows & IP Net- working Core Issues	Requirements, Options & Exclusions	Failure to Comply Causes:
<p>NOTE: The following section has information for RPC, RTCP, TCP, UDP port Management.</p> <p>Some ports have the following classification to assist you with setting up network prioritization. If nothing else, please consider setting up these ports with the following prioritization:</p> <p>1. CC = Call Control ports requiring the highest prioritization</p> <p>2. MS = Media Stream ports requiring the next highest prioritization</p> <p>CAUTION: There is a CAUTION related to port assignments in the Release Notes. Refer to the Release Notes for further information.</p>		
<p>UDP Ports <i>continued...</i></p> <p>NEW >></p>	<p>MG UDP Requirements:</p> <ul style="list-style-type: none"> • 17459 (0x4433) (unicast) - TFTP client port on MG • MS 49408 - 49664 (0xC100 - 0xC200) (unicast) - Default RTP media stream port for MG to MG communication (even ports only). This is the same range as used on VM/AA Default RTP media stream port. • MS 49409 - 49663 (0xC101 - 0xC1FF) (unicast) - Default RTCP port for MG to MG communication (odd ports only). • MS 49920 (0xC300) (multicast) - Default RTP multicast media stream port for MG to MG communication. • MS 49921 (0xC301) (multicast) - Default RTCP multicast port for MG to MG communication. • 53248 (0xD000) (unicast) - CS Config packet send to MGC. • 53249 (0xD001) (unicast) - CS Config packet receive from MGC • 57344 (0xE000) (multicast) - MG poll packet send to MGC. • 57345 (0xE001) (unicast) - MG poll packet receive from MGC. <p>NOTE: the above UDP ports (53248, 53249, 57344, 57345) are ports that could have a conflict with Microsoft's DNS patch. Only SBS systems will have this conflict (see Manager requirements for DNS), and only those who have applied the Microsoft DNS patch (KBKB951748; SBS system administrators should refer to TB126 for instructions on port assignments with the DNS patch).</p>	<p>Spherically system performance may be affected by ports not opened for firewalls, routers, etc.</p>
<p>UDP Ports <i>continued...</i></p>	<p>Spherically Managers Running Media Server UDP Requirements:</p> <p>The Spherically Media Server transmits 80ms RTP packets.</p> <p>The following UDP ports are used by the Spherically system under normal operation:</p> <ul style="list-style-type: none"> • MS 49408 - 49664 (0xC100 - 0xC200) (unicast) - Default RTP media stream port for VM/AA usage on any Spherically Manager (even ports only). This is the same range as used on MG Default RTP media stream port. • MS 49408 - 49600 (48 media sessions) Used by the Media Server for Call Recording(s). • MS 49920 - 50176 (0xC300 - 0xC400) (multicast & unicast) - Default RTP multicast media stream port for MG to MG communication; also used for Media Server-based Music-on-Hold <u>and</u> hardware-based Music-on-Hold (however, you must choose which version of MOH you wish to use, they cannot co-exist on the system). 	<p>Spherically system performance may be affected by ports not opened for firewalls, routers, etc.</p>

Windows & IP Net- working Core Issues	Requirements, Options & Exclusions	Failure to Comply Causes:
<p>NOTE: The following section has information for RPC, RTCP, TCP, UDP port Management.</p> <p>Some ports have the following classification to assist you with setting up network prioritization. If nothing else, please consider setting up these ports with the following prioritization:</p> <p>1. CC = Call Control ports requiring the highest prioritization</p> <p>2. MS = Media Stream ports requiring the next highest prioritization</p> <p>CAUTION: There is a CAUTION related to port assignments in the Release Notes. Refer to the Release Notes for further information.</p>		
<p>UDP Ports <i>continued...</i></p> <p>NEW for Windows 2008 Server</p>	<p>WINDOWS 2008 Requirements for Spherical Server /Client Communication</p> <p>The following TCP ports are used by the Spherical system under normal operation for communication between the mail server and the user client.</p> <ul style="list-style-type: none"> • CC 9999 CallLogger.exe - Service that writes information about calls on the system to a flat text file (*.scl) that can be imported for use with third-party call accounting software. • 9998 CallLoggerGUI.exe • 9997 DbServer.exe - Provides access to the system's Jet database and notifies registered MGC services of database changes. • 9996 DbServerGUI.exe • MS 9995 MGC.exe - Performs the core call control of the system. • 9994 MGCGUI.exe • MS 9993 MediaServer.exe - The process (mediaservice.exe) that integrates native Spherical call processors with the mail server to provide an industry standard voice mail system. • 9992 MediaServerGUI.exe • MS 9991 WebServer.exe • 9990 WebServerGUI.exe • 9989 Spherical.exe - Controls and monitors the function of proprietary Spherical processes • 9988 SphericalGUI.exe • 9987 SMDIService.exe • 9986 SMDIServiceGUI.exe • CC 9985 CAC.exe • 9984 CACGUI.exe • 9983 DesktopManager.exe - Simplifies the installation process for Spherical Desktops in the Spherical environment by allowing administrators to update Spherical Desktops with new files from a central location • 9982 DesktopManagerGUI.exe 	<p>Will not have system operability.</p>

SPHERICALL MANAGER REQUIREMENTS

Disk Space Requirement

Capacity - In order for database maintenance to occur on the Spherically Manager, the manager requires free disk space that is 2.5 times the size of the calls.mdb file. Example: if the calls.mdb file is 1 MB, then the free disk space should be 2.5 MB. Each call consumes an average of 700 bytes per call, therefore, a 2 GB calls.mdb file will hold roughly 2.8 million calls.

- The Spherically system requires a minimum of 15% of disk space free in order to write diagnostic log files. If there is more than 15% free disk space, as it approaches the 15% minimum, the logger will begin deleting older files to accommodate space.
- The call logger requires a minimum of 300MB of disk space free in order to write call log entries into the calls.mdb and .scl text files.
- When disk space drops to 3 GB or less, new calls are not allowed to record. A one hour recorded call uses 27 MB of disk space. If recordings are to be stored on Spherically Manager, be sure to size disk resources appropriately.
- **Space availability on Primary & Secondary Managers:** Algorithms have been designed on the Spherically Manager to detect when the Primary is below the Low Disk Space threshold. This algorithm will stop copying files from the Secondary to the Primary when the Low Disk Space threshold is reached rather than waiting until it reaches the Critical threshold. The Secondary will continue to make recordings while local space is available, but the results will not be moved to the Primary until the Primary free disk space is above the Low Threshold.

Affects: Voice Mail Message Caching and Call Recording

Table .14 Spherically Manager Requirements

Server Core Issues	Requirements, Options, and Exclusions	Failure to Comply Causes:
All Spherically Managers		
DNS	<p>Option: While it is possible to run DNS Server service on the same machine as Spherically Manager, Microsoft's DNS Server service seizes ports that are required for Spherically Media Services as well as ports the MGs use to locate the MGCs. Because of this, the installation must proceed in the proper order if the site wants to run a DNS server on their Spherically server.</p> <p>If your system is an "all in one" solution using SBS, you may have DNS on the server, however, there is a potential conflict with this solution and Microsoft DNS Patch (Microsoft KB951748; see Spherically TB126 for notes on configuration) and the patches utilization of ports.</p>	<ul style="list-style-type: none"> • Media Server is blocked from functioning with Voice Mail.

Server Core Issues	Requirements, Options, and Exclusions	Failure to Comply Causes:
<p>Domains and Active Directory for Spherically Manager</p>	<p>Requirements:</p> <ul style="list-style-type: none"> You must join the Spherically Manager to a Domain. If your organization does not employ the use of domains within its network infrastructure, you must create a Active Directory Server for use by the Spherically Manager(s). The Active Directory may reside on any machine within your organization's network. However, if you choose to build the Active Directory on an existing Spherically Manager, NEC Sphere prefers that the Active Directory reside on a SECONDARY Spherically Manager. <p>Options:</p> <ul style="list-style-type: none"> The Spherically system is supported in an environment where the Domain/Active Directory/Exchange server is a Windows Small Business Server 2008 (SBS). The Spherically Manager is supported on a Small Business Server, but will require a special procedure to integrate MTA as specified in the <i>Book 3: Install Spherically Voice Mail</i>. Windows Server Service Pack may be applied, but requires caution as noted in the operating system section of this table. Also note that CPU number of bits must match between Exchange Server software and Windows Server software. <p>NOTE: See Server Capacity earlier in this document regarding the SBS Server compatibility with Exchange.</p> <p>Exclusions:</p> <ul style="list-style-type: none"> The Domain/Active Directory may not reside on a Primary Spherically Manager except as noted in the Spherically System sizing requirements. 	<ul style="list-style-type: none"> DbServer will not function Replication will not function Endpoints cannot check in
<p>Dual or Multiple Homing TCP/IP</p>	<p>Requirements:</p> <ul style="list-style-type: none"> If multiple Ethernet cards are installed on your organization's Spherically Manager, all but one of the Ethernet cards must be disabled. To disable an Ethernet card: From the Windows taskbar, click Start\Set <p>Exclusions:</p> <ul style="list-style-type: none"> Dual or Multiple homing is NOT allowed (Multiple homing is defined as: either two separate NICs in the Spherically server or multiple IP addresses on the same NIC). 	<ul style="list-style-type: none"> No system stability
<p>Dual Port Ethernet Adapter</p> <p><u>IMPORTANT</u></p>	<p>Teaming is not supported for Dual Port Ethernet adapters. In some cases, a driver does the teaming (Broadcom Advanced Server Program (BASP) driver). Teaming is a configuration that presents two ports as one for the purpose of redundancy or load balancing. In most cases, this configuration still presents a conflict for the Spherically system looking for a single MAC address.</p> <p>Options:</p> <ul style="list-style-type: none"> Broadcom offers NetXtreme Gigabit Ethernet Adapter for a single port NIC that does not present a problem. If you must have a teamed configuration, the only supported/tested teamed NIC hardware at this time is the Intel PRO/1000 MT Dual Port Server Adapter. <p>Exclusions:</p> <ul style="list-style-type: none"> Spherically does not support NICs in a teamed configuration due to a multicast problem in a Broadcom BASP driver found in many OEM NICs. Broadcom NetXtreme Gigabit Dual Port Ethernet Adapter. 	
<p>DVD-ROM</p>	<p>Requirements:</p> <p>Standard media distribution from Spherically for new product shipments is DVD. DVD's will be mailed only by special request. Software updates to our Channel Partners will be via FTP download. FTP Software download will be a zipped file representative of the same items on the DVD.</p>	
<p>Firewall</p>	<p>Windows 2008 server installations with Spherically require additional firewall settings. Refer to Book 2 Chapter 1 for further information.</p>	

Server Core Issues	Requirements, Options, and Exclusions	Failure to Comply Causes:
Hardware	<p>Requirement: Spherical is compatible with Windows 2003 or 2008 Server 64-bit server. Therefore, an all-in-one server for Spherical, Active Directory and Exchange may include Exchange 2007 (requires 64-bit) along with Windows 2003 or 2008 64-bit server.</p>	
Licensing	<p>Requirements:</p> <ul style="list-style-type: none"> Spherical installations are protected by digital signature with elements indicating the customer and Spherical licensee name display. These piracy deterrents provide authorization for new installations, upgrades and capacity systems. 	<ul style="list-style-type: none"> Failure to comply restricts upgrades, limits demos, and prohibits new installs.
Microsoft Internet Explorer v5.1+	<p>Requirements:</p> <ul style="list-style-type: none"> Internet Explorer v5.1.0701+ is required for the proper functionality of the Spherical Administrator application as well as for the reading of HTML help files. 	<ul style="list-style-type: none"> Help files do not function
Microsoft Exchange System Manager	<p>Optional: (no longer required for Spherical Voice Mail) Spherical admins wishing to centrally administrate Spherical and Exchange Mailboxes with Spherical Voice Mail have the option to install Microsoft Exchange System Manager on the Spherical Manager. This pops the Mailbox window prompt along with adding a user to the Domain.</p> <p>Exclusions: Spherical is no longer supporting Outlook client on the Spherical Manager.</p>	
Monitoring	<p>Requirements:</p> <ul style="list-style-type: none"> Spherical systems using monitoring of any kind must use multicast. 	
Network Sharing	<p>Windows 2008 server installations with Spherical require additional network sharing settings. Refer to Book 2 Chapter 1 for further information.</p>	

Server Core Issues	Requirements, Options, and Exclusions	Failure to Comply Causes:
<p>Software Applications on the Spherically Manager</p>	<p>Requirements:</p> <ul style="list-style-type: none"> • Spherically Software as a part of the standard installation <p>In order to prevent compatibility and performance issues, do not load any additional software on the Spherically Manager.</p> <p>Options:</p> <p>The following software is not included with the Spherically installation, but may be installed separately:</p> <ul style="list-style-type: none"> • winzip • pcAnywhere • Acrobat Reader 7.0+ (for using the Document Index search feature) <p>Note: A DHCP server, FTP server, and an SNTP server may run on a Spherically Manager for IP Phone configuration. These services are NOT factory installed or preconfigured on any Spherically Manager and may interfere with optimal operation of the Primary Spherically Manager.</p> <p>Optional Build:</p> <p>The Spherically system can support the combination of the Spherically manager, Active Directory server and Exchange server running on the same machine for voicemail only applications (not providing email services to users). Refer to the system sizing section for information on port capacity limits for this configuration.</p> <p>Recommendations:</p> <ul style="list-style-type: none"> • <u>FTP Server</u> running on the Primary Spherically Manager is the recommended location for optimal use and upgradability. Reminder: While it is possible to run the FTP Server on the Primary Spherically Manager, both the FTP server and DbServer are under greatest loads during check-in. • <u>Windows Server 2008 environments:</u> the Windows server feature "Desktop Experience" must be installed on the Spherically Manager in order to correctly convert WMA and MP3 files to WAV format for Music On Hold media. <p>Exclusions:</p> <ul style="list-style-type: none"> • All other software applications are excluded. Spherically Managers built with added, unapproved applications are not supported. • Windows Small Business Server 2003. • The Spherically Softphone application is <u>not supported</u> on the Spherically Manager. <p>Exclusions:</p> <ul style="list-style-type: none"> • Systems integrating IMAP for unified messaging with another third-party e-mail application will not receive the Spherically Voice Mail form. • FTP services supporting non-Spherically applications running on a Spherically Manager is <u>not supported</u>. 	<ul style="list-style-type: none"> • Resource availability
<p>Spherically Media Server</p>	<p>The following features on the Spherically system require a Spherically Media Server (The Spherically Media Server transmits 80ms RTP packets):</p> <ul style="list-style-type: none"> • Spherically Voice Mail • Auto Attendant • Queuing (if using Media Server based Music-on-Hold with Queuing, Queuing requires multicast) • Media Server based Music-on-Hold (requires multicast) (cannot run at the same time as hardware-based music-on-hold) • Spherically Voice Mail Message Waiting Indication (all supporting endpoints must be connected to a Spherically Manager using Spherically Media Server) Note: If a third-party voice messaging system is used, the Spherically Media Server is not required for Message Waiting Indication. • Failed call announcements • Call Recording • MLPP announcements 	

Server Core Issues	Requirements, Options, and Exclusions	Failure to Comply Causes:
Processors for Spherical Manager	<p>Recommendation:</p> <ul style="list-style-type: none"> The Spherical Manager can run on a single- or multi-processor system. For multi-processor systems, the Spherical system installation will detect and distribute the installation as appropriate. See tables below for more information on processors when utilizing the Call Recording or Voice Mail Feature. <p>Requirement:</p> <ul style="list-style-type: none"> For larger Spherical systems, hyperthreading is required. <p>Please refer to the system sizing section of this guide for further details on hyperthreading.</p>	
Screen Resolution	<p>Minimum:</p> <ul style="list-style-type: none"> All Spherical administrative applications require a screen resolution of 1024 X 768 pixels. 	<ul style="list-style-type: none"> unable to navigate all windows on the application
System Backups	<p>Requirements:</p> <ul style="list-style-type: none"> Only perform backups during zero or low-call usage periods. Poorly-timed backups of the Spherical Manager can cause a significant degradation of performance. Backups should be "passive" and should not terminate or shut down any processes or services. 	<ul style="list-style-type: none"> could cause service to be affected

Table .15 Spherical Manager Requirements

MEDIA SERVER CODEC SUPPORT

Media server supports recording calls that are audio encoded using G.711, G.729, SPEEX narrowband, SPEEX wideband, and SPEEX ultra-wideband CODECs. The iLBC CODEC is not supported by media servers.

To support multiple CODECs, the media server decodes the endpoint audio streams into the linear domain before they are summed and stored to disk. Different CODECs require different amounts of CPU resources. The media server uses the following table in determining the maximum number of concurrent recordings it will support assuming 50% processor availability.

Note: This is not true for Music on Hold. Music on Hold only supports G.711.

Table .16 Server Sizing: Spherical Call Recording

CODEC	# of concurrent recordings for 1 GHz processor	# of concurrent recording for 2.4 GHz processor	# of concurrent recordings for 2.8 GHz processor
G.711	48	48	48
G.729AB	29	48	48
SPEEX NB	48	48	48
SPEEX WB	17	42	48
SPEEX UWB	4	10	12

Voice mail and AA functions require encoding of prompts and decoding of VM messages. Encoding for compressing CODECs requires significantly more CPU resources than decoding, thereby reducing the number of concurrent sessions when compared to recording. The media server uses the following table in determining the maximum number of concurrent voice mail and auto-attendant sessions it will support assuming 50% processor availability.

Table .17 Server sizing: Spherically Voice Mail

CODEC	# of concurrent VM sessions for 1 GHz PIII processor	# of concurrent VM sessions for 2.4 GHz Xeon processor	# of concurrent VM sessions for 2.8 GHz P4 processor
G.711	48	48	48
G.729AB	9	22	26
SPEEX NB	4	11	13
SPEEX WB	2	5	6
SPEEX UWB	1	3	4

When a call recording, voice mail, or AA call is setup, the media server tailors its CODECs list during CODEC negotiation to remove any CODEC that it does not have enough CPU resources to support.

SPHERICALL VOICE MAIL SOFTWARE REQUIREMENTS

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Software Core Issues	Requirements, Options, and Exclusions	Failure to Comply Causes:
Spherically Voice Mail & Media Servers		
Spherically Manager Microsoft Windows Operating System	Requirements: The Spherically Voice Mail application requires <ul style="list-style-type: none"> • See Spherically Manager server information above. 	

Software Core Issues	Requirements, Options, and Exclusions	Failure to Comply Causes:
<p>Microsoft Exchange Server 2003 or 2007</p>	<p>Recommendation: Microsoft Exchange Server hard drive sizing: account for 10 GB Hard Drive providing 340 hours of storage space for voice mail only. Exchange Server unit must meet all other equipment minimum hardware requirements set forth by Microsoft.</p> <p>Options:</p> <ul style="list-style-type: none"> The Spherical system is supported in an environment where the Domain/Active Directory/Exchange server is a Windows Small Business Server 2008 (SBS). The Spherical system can support the combination of the Spherical manager, Active Directory server and Exchange server running on the same machine. However, system sizing should be carefully calibrated for load. Refer to the system sizing section for information on port capacity limits for this configuration. Note: The SBS solutions that are supported are those in systems where the operating systems match in the number of CPU bits: example: Windows 2003 32-bit Server is only compatible with Exchange 2003 32-bit server; Windows 2003 64-bit Server is only compatible with Exchange 2007 64-bit server. <p>Requirements: EITHER software may be used:</p> <ul style="list-style-type: none"> Microsoft Exchange 2007 + SP1 Requires a 64-bit server. Exchange 2007 can run on the same server as Spherical v6.3+ with a Windows 2003 64-bit CPU. Microsoft Exchange 2003 (Standard or Enterprise Edition) + Service Pack 2 <p>Exclusions - Not Supported:</p> <ul style="list-style-type: none"> The Spherical system does not support Spherical Voice Mail (unified messaging system) and the Exchange 2007 UMS Voice Mail solution running on the same system (you must choose only one UMS system). Exchange 2007 (64-bit) cannot run on the same server as Spherical built with a Windows 2003 32-bit CPU. Symantec software v4.5.2.737. Microsoft Windows Small Business Server 2000 for the Active Directory/Exchange server. Microsoft Exchange 2000 (Standard or Enterprise Edition) + Service Pack 3 + Rollup 	<ul style="list-style-type: none"> Inadequate storage capacity of messages Forms required will not be transferred to Exchange
<p>Call Sessions</p>	<p>Design Recommendations: This information applies to Queuing and Announcements, Voice Mail Prompts and Introductions:</p> <ul style="list-style-type: none"> Maximum of 48 simultaneous Media Server session ports per manager. If a system needs more than 48 ports, an additional Spherical Manager with Spherical Voice Mail must be installed. The use of unified messaging or MWI may lower the demand for voice mail sessions. The maximum of 48 simultaneous Media Server sessions per manager number may be lower depending on server hardware specifications and audio CODECs used. <p>Options: n/a Exclusions:</p>	<ul style="list-style-type: none"> interruptions in busy hour availability

Software Core Issues	Requirements, Options, and Exclusions	Failure to Comply Causes:
<p>Microsoft Exchange System Manager</p>	<p>Optional: (no longer required for Spherical Voice Mail) Spherical admins wishing to centrally administrate Spherical and Exchange Mailboxes with Spherical Voice Mail have the option to install Microsoft Exchange System Manager on the Spherical Manager. This pops the Mailbox window prompt along with adding a user to the Domain.</p> <p>Exclusions:</p> <ul style="list-style-type: none"> • Spherical does not support Outlook client on the Spherical Manager. • Courtesy notice: Microsoft has a limitation against placing Microsoft Exchange System Manager on the same P.C. as Outlook client (either on a Server or Client). 	
<p>Multiple Domain Integration</p>	<p>Requirement:</p> <ul style="list-style-type: none"> • A single Domain for the Spherical Manager to report to. 	
<p>Multiple Exchange Servers</p>	<p>Requirements:</p> <ul style="list-style-type: none"> • A Spherical Manager may point to only ONE Exchange Server; many Spherical Managers may point to only ONE Exchange Server; many Spherical Managers may point to many Exchange Servers only if each Spherical Manager only points to ONE Exchange Server, and that server <i>must be</i> Exchange 2003. • The Spherical system will look for a Global Catalog (GC) in the same domain as the first Exchange server in the database. If no GC is found, then the GC in the root of the forest in which the computer running Spherical DbTool is used. Therefore, Spherical DbTool must be run in the same forest as the AD users to be migrated. NOTE: Microsoft recommends that there be at least one GC per domain. See http://support.microsoft.com/kb/875427 <p>Exchange Servers in a Forest Spherical may run in a forest other than the forest in which the Exchange Server(s) run with the following caveats:</p> <ol style="list-style-type: none"> 1. Users with mailboxes must reside in the same forest as Exchange (Exchange itself imposes this restriction). 2. Spherical Desktop application users may reside in any trusted forest. 3. The Extension Properties "Add User" function will only allow the user to be created in/selected from the forest of the first configured Exchange server. If No Exchange server is configured, the operation will be disabled (Note: all bets are off if a customer switches to an Exchange Server in a new forest). 4. The User Rights pane will allow users to be added from any trusted domain in order for the user to be given line rights, and therefore the ability to run a Spherical Desktop. 5. The Import function will enforce caveat 1 above. <p>NOTE: The media server will silently ignore users that are not in the configured Exchange Server forest.</p>	
<p>Multiple Spherical Managers</p>	<p>Requirements: If Spherical Voice Mail will be used on the Spherical system, Spherical Media Server processes must be running on all Spherical Managers within the system.</p>	

SPHERICALL V7.0.1 SYSTEM REQUIREMENTS

Spherical Voice Mail Software Requirements

Software Core Issues	Requirements, Options, and Exclusions	Failure to Comply Causes:
<p>Unified Messaging - Microsoft Outlook</p>	<p>The following versions of Microsoft Outlook Client are supported ONLY on a client PCs intended for the integration of Unified Messaging with Spherical Desktop (Customers must purchase this software):</p> <ul style="list-style-type: none"> • Outlook 2002 • Outlook 2003 • Office 2007's Outlook client <p>Requirements:</p> <ul style="list-style-type: none"> • Vista operating systems will need SP1 for Spherical Voice Mail forms to download correctly. • Outlook 2003 SP3 requires a registry key setting change in order to download Spherical Voice Mail forms correctly. See the following: http://support.microsoft.com/?kbid=938816 • Outlook 2007: Click Tools\Options\Other\Advanced Options\Custom Forms. Select the Allow forms that Bypass Outlook check box. Click OK. 	<ul style="list-style-type: none"> • unified messaging requires Outlook client software installed
<p>Unified Messaging IMAP4</p>	<p>The Spherical system supports the option to relay the voice messages to a third-party e-mail server via IMAP (Internet Message Access Protocol version 4).</p> <p>Requirement:</p> <ul style="list-style-type: none"> • IMAP4. <p>Exclusion:</p> <ul style="list-style-type: none"> • iMap does not support international tones and cadences 	
<p>User Names</p>	<p>Requirements:</p> <p>The Spherical Voice Mail system does not currently have a way to differentiate between more than 9 of the same last names (or combination of keypad strokes, DTMF tones) within the Auto Attendant directory lookup. A maximum of 9 user last names may be the same name or have the same combination of keypad strokes within the system. Some last names, which are shortened versions of other last names, may also present the same dilemma for the DTMF tones when dialing (Example: Johns and Johnson; Hans and Hansen).</p>	<ul style="list-style-type: none"> • Directory lookup will not function properly for all users

LANGUAGES SUPPORTED IN AUTO ATTENDANT AND SPHERICALL DESKTOP

Language Selection

The following languages are supported.

Dutch (NLD)	French (FRA)	Spanish (ESM)
English (ENG)	German (DEU)	Spanish (ESP)
English (USA)	Italian (ITA)	Swedish (SVE)
French (FRC)	Japanese (JPN)	

SPHERICALL DESKTOP REQUIREMENTS

Table .18 Desktop

Software Core Issues	Requirements, Options, and Exclusions	Failure to Comply Causes:
Sphericall Desktop Only		
ActiveX	<ul style="list-style-type: none"> • Federal Installation Note: Federal Desktop Core Configuration (FDCC) on Windows XP and Vista is a mandate issued by US federal government. Under these guidelines, ActiveX controls are blocked by default. It is recommended that Federal systems falling under FDCC requirements consult the documentation for enabling ActiveX. The Desktop CallLogger uses ActiveX write information to the call's database. • Workarounds: Package the ActiveX controls and distribute them using standard software distribution solutions such as SMS, Altiri or Tivoli and/or via Active Directory Group Policy. Vista offers the ActiveX Installer Service (AxIS), which can install ActiveX controls that have been approved by Group Policy. Other solutions are offered on Microsoft online. 	
Audio File New ->	<p>When integrating an audio file with the Sphericall Desktop or Sphericall Desktop Softphone for playing a ringing tone through the PC's specified audio device, only use the following type of file:</p> <ul style="list-style-type: none"> • .wav file (8bit, mono) PCM Audio format • .mp3 files are only used with the Sphericall Voice Mail Form applet and unified messaging with Outlook (if used on your system) 	No audio ring tone from PC
Call Recording	<p>Requirement: Call Recording Playback requires the Sphericall Desktop client software for security and permissions in the playback function.</p> <p>Exclusion: The Call Recording feature is NOT supported in legacy ATM environments.</p>	No functionality of playback.

Software Core Issues	Requirements, Options, and Exclusions	Failure to Comply Causes:
Domains	<p>Requirements:</p> <ul style="list-style-type: none"> All Spherical system users and addresses require Windows credentials, which consist of the user name, domain and password provided by Active Directory.\ For security, those systems wishing to use the Call Recording feature are required to join the Spherical Desktop to the Spherical Manager's Domain, or be trusted by that Domain. This is essential for users to playback recordings from the Spherical Desktop application. 	No call recording playback from Spherical Desktop.
Line Monitoring	<p>Recommendations:</p> <p>Multicast monitoring is recommended for general monitoring on the system. The MGC performance is a function of the number of addresses being managed multiplied by the number of multicast groups (zone or address groups) the addresses are a member of. The monitoring desktop application performance is a function of the number of addresses being monitored. For very large systems, you may find that the operator may have user rights, traffic and/or usability issues related to too many extensions/addresses to monitor. This may vary from system-to-system.</p> <p>Caution: Unicast monitoring does exist in the system and could potentially have a performance bottle neck at the MGC, since it is a function of the lines being monitored times the number of applications monitoring each line.</p>	
Microsoft Internet Explorer v5.1+	<p>Requirements:</p> <p>Minimum Internet Explorer version is:</p> <ul style="list-style-type: none"> Internet Explorer v5.1+ is required for the proper functionality of the Spherical Desktop reading of HTML help files and URL dialer functions. The Spherical Manager is built with this version of software. <p>Exclusions:</p> <ul style="list-style-type: none"> Netscape Navigator is not a supported browser for integration with the URL dialer function with the Spherical Desktop. 	<ul style="list-style-type: none"> help files do not function
Microsoft Outlook client	<p>The following versions of Microsoft Outlook Client are supported ONLY on a client PCs intended for the integration of Unified Messaging with Spherical Desktop (Customers must purchase this software):</p> <ul style="list-style-type: none"> Outlook 2002 Outlook 2003 Office 2007 Outlook client <p>Exclusion and Courtesy Note for Administrators: Microsoft has a limitation against placing Microsoft Exchange System Manager on the same PC as Outlook client (either on a Server or Client).</p>	<ul style="list-style-type: none"> unified messaging with Outlook will not work without software installed
Monitor Display Settings	<p>Requirements:</p> <ul style="list-style-type: none"> Minimum resolution for quality video in the Spherical Desktop is 800 x 600 pixels. <p>Options: n/a</p> <p>Exclusions: n/a</p> <p>Recommendation:</p> <ul style="list-style-type: none"> It is recommended that if you configure a video screen resolution greater than 800 x 600 pixels, you should configure the color setting to "High Color" or "True Color." If screen resolution is configured to 800 x 600 pixels, you can configure the color setting to 16 or 256 colors. 	
Multicast	<p>Requirements:</p> <ul style="list-style-type: none"> Multicast is required to monitor with the Spherical Desktop. Operators may have a higher requirement for capacity when monitoring extensively. 	

SPHERICALL V7.0.1 SYSTEM REQUIREMENTS

Spherically Desktop Requirements

Software Core Issues	Requirements, Options, and Exclusions	Failure to Comply Causes:
Name Resolution	<p>Recommended:</p> <ul style="list-style-type: none"> Required for configuration using the Spherically Desktop. Multiple methods of name resolution are allowed for the Spherically Desktop interacting with the Spherically Manager: <p>Preferred - Local DNS (Domain Name Resolution); Local WINS and/or DNS are required for a reliable Spherically Desktop screen appearance.</p> <p>Acceptable - WINS (NetBIOS name resolution).</p> <p>Options:</p> <ul style="list-style-type: none"> Host files may be used for backup. You must maintain the host files to ensure proper functionality. IP address of the MGC may be entered upon installation of the Spherically Desktop software. <p>Exclusions:</p> <ul style="list-style-type: none"> Remote DNS 	<ul style="list-style-type: none"> Cannot connect Desktop user to the database functions
Operating Systems	<p>Requirements: (ONE of the following)</p> <ul style="list-style-type: none"> Microsoft Windows Vista SP1 32- or 64-bit* Microsoft Windows XP SP3 32- or 64-bit* <p>*Note 1: During the Spherically Desktop installation, a registry value for TOS is set to disabled. Therefore, the level of permissions needed to install the Spherically Desktop must be an Administrator to set this value when installing on any 64-bit machine. Systems using MSI for the installation will not encounter this issue, since administrative permissions are used for MSI.</p> <p>Note 2: Spherically Service Provider is not supported on a Microsoft Windows 64-bit platform. Therefore, dialing from the Outlook application is not supported on 64-bit platforms.</p> <p>Note 3: Spherically Desktop with XP appearance and icons is only available on XP clients.</p>	
Operator Stations	<p><u>Operator Stations</u></p> <p>Exclusions:</p> <ul style="list-style-type: none"> Win2K Server and Professional are not supported for the Spherically Administrator application and maintenance <p>Recommendation:</p> <ul style="list-style-type: none"> The employment of PCs equipped with faster processors and higher amounts of RAM for improved Operator Monitoring capabilities. 	
SIP Phones	<ul style="list-style-type: none"> Spherically Desktop supports several models of SIP phones. Review the Hardware and Software Compatibility table earlier in this document. Refer to the SIP Phone matrix for Foundations. 	
Spherically Desktop Platform	<p>Requirements:</p> <p><i>Minimum requirements as necessary for the Microsoft operating system.</i></p> <ul style="list-style-type: none"> Minimum requirements for PCs hosting Spherically Desktop with <u>3-party Video Conferencing</u> are: Pentium 4+ processor; 2.4+ GB Hard Drive; 512+ RAM (or equivalent) 	<ul style="list-style-type: none"> PC and video will be choppy; if running with Soft-phone further degrading service
Spherically Version	<p>Requirement:</p> <ul style="list-style-type: none"> Spherically Desktop software version must match the same version as the Spherically Administrator application version. Refer to the Hardware & Software Compatibility table for build versions in this release. 	<ul style="list-style-type: none"> Desktop will not open

Table .19 Spherical Desktop Softphone Requirements

Software Core Issues	Requirements, Options, and Exclusions	Failure to Comply Causes:
Spherical Desktop Softphone		
Citrix	Requirements: Citrix environment is required to support audio devices. The Spherical Softphone requires this feature.	<ul style="list-style-type: none"> softphone has no audio
Codecs	<p>Spherical Desktop supports the following codecs:</p> <ul style="list-style-type: none"> G729 G711 Speex_UWB Speex_WB Speex_NB iLBC PCMU PCMA <p>Requirements:</p> <ul style="list-style-type: none"> Codecs must match at both ends. 	<ul style="list-style-type: none"> call setup may not occur
Echo Cancellation	<p>Requirement:</p> <p>Only handset devices with no echo cancellation should be used.</p>	<ul style="list-style-type: none"> Echo
Name Resolution	See Desktop.	
Network Connection	<p>Requirements: Network connectivity to the Spherical Manager (MGC) is required.</p> <p>Options: Users may establish a VPN connection prior to using the Spherical Softphone when connecting across a public network (such as the internet).</p> <p>Recommendation:</p> <ul style="list-style-type: none"> For best softphone performance, softphone media is recommended over a wired connection. Wireless performance will vary based on subnet, subnet of the MGC vs. softphone, and bandwidth resources. Detailed multihomed guidance is documented in the Spherical Desktop installation in <i>Book 2: Install and Configure Spherical</i>. 	<ul style="list-style-type: none"> no functionality
Operating Systems	See Desktop.	
Sound Card	<p>Requirement:</p> <ul style="list-style-type: none"> The following setting must be installed and enabled in order for a higher audio quality of service with the softphone device: QoS Packet Scheduler (documents have this configuration outlined). <p>Options:</p> <ul style="list-style-type: none"> The performance of sounds cards varies widely and sound quality may be affected. 	<ul style="list-style-type: none"> voice & audio quality may be affected

SPHERICALL V7.0.1 SYSTEM REQUIREMENTS

Spherically Desktop Requirements

Software Core Issues	Requirements, Options, and Exclusions	Failure to Comply Causes:
<p>Spherically Desktop Softphone Platform</p>	<p>Requirements: <i>Minimum Processor:</i> Pentium III 600 MHz <i>Minimum Memory:</i> 128 MB (for Spherically Desktop Softphone only) <i>Minimum Hard Drive:</i> 2 GB <i>Capture Filter:</i> Greater than DirectX 8.1 or higher</p> <p>Recommendations:</p> <ul style="list-style-type: none"> • <i>Recommended Memory:</i> 256 MB. Need enough memory to stop the swapping of applications. • When using both audio and video simultaneously, client PCs will need additional resources. It is recommended a minimum of 800 MHz system in this case. • It is strongly recommended the use of a USB handset/headset for Spherically Softphone operation. • When using both audio and video simultaneously, PCs may need to have a second USB card for supporting video. <p>Options:</p> <ul style="list-style-type: none"> • USB Hubs may not provide the most consistent voice quality. The most consistent voice quality is found with a direct USB connection rather than a shared USB connection. <p>Exclusions:</p> <ul style="list-style-type: none"> • Spherically Softphone operation on the Spherically Manager is not supported. 	
<p>USB Headset</p>	<p>Recommended: Labtec Axis 502 Plantronics USB Headset Model DSP-400 Plantronics CS50-USB Wireless Headset (may require its own firmware)</p>	
<p>USB Handset</p>	<p>Recommended: Eutectics IPP200 • DirectX 8.1 required. Eutectics IPP200T • DirectX 8.1 required. Eutectics IPP520 • DirectX 8.1 required.</p>	<p>low quality of service</p>

Table .20 Spherically Desktop VIDEO Information

PC Hardware Core Issues	Requirements, Options, and Exclusions	Failure to Comply Causes:
<p>Spherically Desktop Video Camera Operation</p>	<p>Spherically Desktop supports displays in formats at: CIF: 352 X 288 pixels QCIF: 176 X 144 pixels QVGA: 320 X 240 pixels VGA: 640 X 480 pixels Generally: H.263 = 128 kbps per call; MPEG4 384 kbps per call Spherically Desktop only supports video on the following operating systems:</p> <ul style="list-style-type: none"> • Windows XP SP3 • Windows Vista SP1 <p>Note: Refer to the manufacturers website for the latest drivers or support for individual USB cameras.</p>	

NOTES:

Video bandwidth numbers are targets set for the CODECs. Actual numbers may vary as much as 15%. Audio bandwidth numbers take into account packet header overhead.

PC specs should be increased if the Spherically Desktop will do any of the following:

- Run both video and audio simultaneously
- Act as “initiators” for conference calls
- Save manually call recordings to their local PC (disk space requirements increase proportionally)

SMDI SYSTEM INTEGRATION

All information pertaining to the planning, integration and requirements for SMDI voice mail integration is located in *Book 4: Integrate Partner Technologies* manual.

OPTIONAL SPHERICALL SYSTEM INTEGRATIONS

Table .21 Optional Integration Information

Optional Integrations	Requirements, Options, and Exclusions
<p>Call Log Interface</p>	<p>Requirements:</p> <ul style="list-style-type: none"> • Must comply to the Spherically call log text file structure (as defined in <i>Book 5: Manage, Monitor & Support Spherically Manual</i>). <p>Options: Support for transmission of call detail records over UDP ports on network.</p> <p>Exclusions: n/a</p>
<p>Enhanced 911 Service</p>	<p>Requirements:</p> <ul style="list-style-type: none"> • T1-ISDN interface must be used in each geographic location in which there is a local Public Service Answering Point or Emergency Service Center. • Local CO must support ANI. • Customer must coordinate with service provider to maintain location database at PSAP or ESC. <p>Options for 911 only:</p> <ul style="list-style-type: none"> • BranchHubs, T-1 CAS COHubs or Quintum Gateways may be used for 911 service only, for which CallerID is required. <p>Exclusions: n/a</p>

Optional Integrations	Requirements, Options, and Exclusions
<p>Emergency Call Notification</p> <p>NEW -->></p>	<p>Requirements:</p> <ul style="list-style-type: none"> • The Spherically system accommodates notification of emergency calls through the use of Microsoft's Event Viewer or the Task Scheduler. • Windows Event Messaging: Emergency Call Notification via Windows Event messaging is supported on Microsoft Windows Servers. • Starting in V7.0, an entry will be placed in the Windows Application Log whenever an emergency call is made. System administrators can monitor the Windows Application Log for this message using Microsoft's Event Viewer or using a third party monitoring and alerting application. • The event will have a Source of "Spherically Manager" and an Event ID of "549". The message body will include: extension, first & last names and zone. • Windows 2008 & Vista Task Scheduler 2.0: this tool can be configured to monitor specific events. See http://en.wikipedia.org/wiki/Task_Scheduler and http://msdn.microsoft.com/en-us/library/bb756979.aspx for brief descriptions of the task scheduler. • The Task Scheduler has three actions available for responding to a trigger: Start a Program, Send an e-mail, Display a message. The Send an e-mail action will send an administrator-defined e-mail to any recipient. Unfortunately the message body of the triggering event has no option to be included in the e-mail. The recipient will know there was an emergency call placed, but will not know which extension made the call. • Event alert applications for Windows Events are available, however any third-party applications, popup blockers or firewalls could potentially block this notification if not configured correctly. Spherically system administrators must configure and test to their own specifications. <p>Options: n/a Exclusions: n/a</p>
<p>Music-on-Hold Interface</p> <p>Third-party (station-side)</p>	<p>Requirements:</p> <ul style="list-style-type: none"> • Analog station-side, hardware-based interface. • 600 Ohm interface. • Adjustable volume. <p>Options: n/a Exclusions: Hardware (station)-based Music-on-Hold cannot run on the system simultaneously with Spherically's Media Server-based Music-on-Hold.</p>
<p>Modem and Fax Use</p>	<ul style="list-style-type: none"> • PhoneHubs support modem and fax at an average/expected throughput of 33.6 kbs. • BranchHubs support modem and fax at an average/expected throughput of 14.4 kbs. <p>Modem rates will vary based on the quality of the PSTN connection, number of analog to digital conversions, and network performance (jitter, latency, dropped packets).</p> <p>Requirements: n/a Options: n/a Exclusions:</p> <ul style="list-style-type: none"> • Do NOT use compression in conjunction with fax machines or modems.
<p>Paging Interface</p>	<p>Requirements:</p> <ul style="list-style-type: none"> • 600 Ohm station interface. • Must detect loss of loop current, silence, and/or dial tone. <p>Options: For BranchHub only, an analog loop-start trunk interface may be used. Exclusions: n/a</p>
<p>Power Failure Transfer</p>	<p>Requirements: n/a Options:</p> <ul style="list-style-type: none"> • Consider the following if your organization desires failover functionality: Each PhoneHub has one PFT Port on <u>pair 25</u> that fails over to <u>pair 1</u> on network or power failure to the PhoneHub. An analog line must be connected to that 25th pair. Service for this analog line must be purchased by your organization from the local telephone service provider. The first 6 stations on a BranchHub connect to the 6 analog trunk lines on network or power failure. <p>Exclusions: n/a</p>

Optional Integrations	Requirements, Options, and Exclusions
<p>Telephone Features</p>	<p>Requirements:</p> <ul style="list-style-type: none"> • 600 Ohm interface. • 24 AWG on-premise wiring only: 2000 feet (609 meters) maximum loop length • 26 AWG on-premise wiring only: 1000 feet (304.8 meters) maximum loop length <p>Option:</p> <ul style="list-style-type: none"> • FSK caller ID and message waiting indicator. <p>Exclusions:</p> <ul style="list-style-type: none"> • Rotary dial phones. • Voltage message waiting.
<p>Uninterruptible Power Supply</p>	<p>Requirements: n/a Options: n/a Exclusions: n/a Recommendation:</p> <ul style="list-style-type: none"> • It is highly recommended that you connect all NEC Sphere MGs and Spherical Managers to uninterruptible power supplies with power conditioning and high voltage suppression. • IP phones may be powered locally at the desktop. OR, for IP phone power failure protection, IP phones may be supported via power over Ethernet.
<p>WebSample</p>	<p>Requirements:</p> <ul style="list-style-type: none"> • Internet Explorer 6+

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