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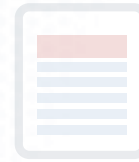
Monitoring and Managing Microsoft OCS 2007 R2

October 18, 2009

This white paper examines OCS 2007 R2

architecture, planning and deployment with a

focus on monitoring and managing common

issues according to Microsoft and Azaleos

Best Practices.

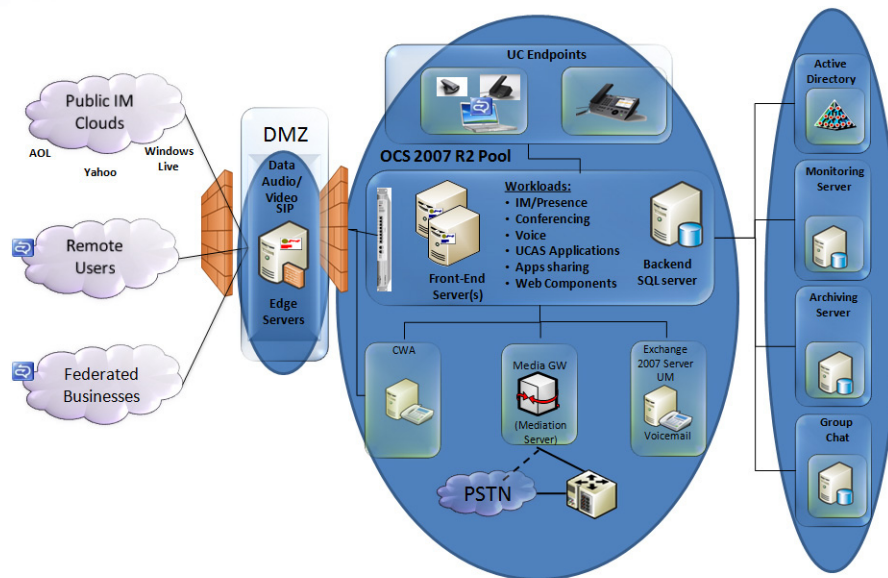whitepaper

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Introduction

OCS Architectural Overview

OCS 2007 is a complex product with a number of dependencies on other computing infrastructure. The OCS 2007 architecture is shown in Figure 1 below.

Figure 1

This white paper begins with a look at the OCS 2007 R2 Architecture and how to plan and deploy it. Planning for deployment is an important first step in monitoring and managing OCS. We'll also examine roll out and the monitoring and maintaining of OCS 2007 . Throughout the paper, we'll take in-depth looks at common management issues encountered with OCS along with best practices & tips and tricks learned from the field.

Before implementing your Office Communications Server R2, be sure to spend time on planning and architecture to ensure smooth monitoring and management.

A pool can be either a single Standard Edition server (with co-located SQL Server Express service), a single Enterprise Edition (EE) server, or two or more EE servers with a hardware load balancer.

A Closer Look: OCS Architecture

The architecture of OCS can be sub-divided in to several key areas:

The Pool
This is the center of OCS. The pool, which consists of one or more OCS servers and an associated SQL service, provides the core functions of OCS and is a required component. OCS comes in two variants: Standard Edition, and Enterprise Edition. A pool can be either a single Standard Edition server (with co-located SQL Server Express service), a single Enterprise Edition (EE) server, or two or more EE servers with a hardware load balancer. With EE, you need a separate SQL server.

Clients
 OCS Users utilize a client application, including Microsoft Office Communicator (MOC), Live Meeting Console, and OCS Attendant Console, to make use of OCS.

Enterprise Voice
 To support Enterprise Voice, you need one or more additional Mediation servers and related media gateway devices. The mediation server and gateway combination are needed to support voice access to wider telephone system (either direct, via your PBX, or via a SIP Cloud provider). A/V conferencing, Live Meeting audio/video and internal VOIP using MOC or LM Console do not require Enterprise Voice to communicate inside the organization. OCS2007 today lacks some of the functions larger enterprise customers might require of a PBX replacement, such as E911 and branch office resilience; these features and more are planned for future releases.

Edge
The edge services, which run on one SE server or one or more EE servers, provides support for remote users (users in your Active Directory residing outside the corporate firewall) and federated users (an encrypted and presence-aware channel to users from some organization with OCS that you can trust). You can also use the Edge services to federate with public IM services (specifically MSN, AOL and Yahoo) for Instant Messaging. To enable remote and federated users to access the Live Meeting feature, you also need a reverse proxy, such as a Microsoft ISA server.

Optional OCS Servers
These additional servers provide additional services but are not required to support basic use. Nevertheless, most larger organizations will deploy them, including the OCS Monitoring and OCS Archiving Servers, OCS Communicator Web Access server, and OCS Group Chat server.

Dependencies
These are non-OCS servers that are required or optional. Required services include Active Directory, DNS, and Certificates.

Planning for OCS Deployment

Based on your unique business requirements, you need to first determine which OCS roles you will install, and the approach to high availability and scaling. You need to do a technical design to enable you to cost and justify your proposed implementation.

Planning should in part be driven by the features you plan to deploy. Consider a two phased deployment strategy, whereby you roll out an initial subset of functionality first (e.g. IM/Presence only) and then follow that 6-12 months later with additional conferencing and telephony features. The following is a list of OCS features to consider when planning your OCS deployment:

Instant Messaging and Presence
This is the starting point for most OCS deployments.

Public Instant Messenger Connectivity
This may be appropriate but requires extra licensing and additional provisioning which can take 2-4 weeks.

Audio and Video Conferencing
These features are popular, but require some additional configuration and in deployment additional bandwidth.

Web Conferencing
You can run Live Meeting either internally, or via the external service. This feature also requires good bandwidth.

Communicator Web Access
Optional feature useful for organizations that have non-Windows clients (e.g. MACs or Linux/Unix workstations).

Archiving Instant messaging
Archive IM conversations for compliance - some organizations may require this, while for others it's optional.

Group Chat
This is a new feature in R2, and is installed and managed outside the standard installation process. A separate client is needed for Group Chat which you need to deploy independently of Microsoft Office Communicator.

High Availability
This can have a significant impact on your deployment as it requires a combination of hardware load balancers and additional Enterprise Edition Servers. There is no High Availability option using Standard Edition.

Enterprise Voice
Uses OCS as your PBX, and might include the Office Communicator Phone Edition device. You may want to install IM/Presence and conferencing before embarking on a full Enterprise Voice deployment.

Exchange UM Connectivity
If using OCS as a telephony solution or if you are running Exchange 2007 or later, you can use Exchangte Unified messaging as your voice Mail solution. This involves tying your OCS system to Exchange and leveraging Exchange Unified Messaging (UM). Exchange UM can also provide automated attendants to simplify user inbound calling.

In addition to these OCS 2007 features, plan for the dependencies in your organization to ensure they are met in a timely fashion. Supporting OCS requires DNS entries (specifically for client auto-discovery), digital certificates for all servers (and the root CA cert for all clients), updated firewall policies and an Active Directory whose schema must be extended prior to installing OCS itself. For Enterprise Edition, plan for external SQL Servers to support deployment.

In larger organizations, these dependencies may be fulfilled by different groups in the organization possibly funded by different budgets and separately managed. Engage these stake holders as early as possible so as to ensure you have a smooth deployment.

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Consider a two phased deployment strategy, whereby you roll out an initial subset of functionality first (e.g. IM/Presence only) and then follow that with additional conferencing and telephony features.

There are two core pool architectures around which you will want to focus your deployments: Single Standard Edition Pool and the Consolidated Enterprise Edition Pool.
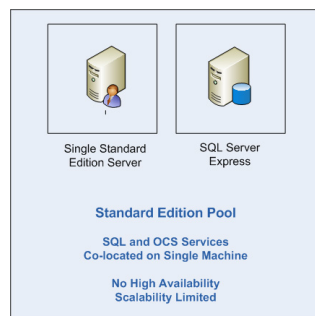
OCS Pool Architectures

Managing the Stack

An important aspect of your overall OCS design is planning to deploy your pool. The pool is the core feature of OCS - install it and clients then access for all OCS functions. A pool must be in place before you can make use of Edge services and external voice scenarios. The pool design enables you to both scale your implementation and to provide for fault tolerance and high availability.

There are two core pool architectures around which you will want to focus your deployments: Single Standard Edition Pool and the Consolidated Enterprise Edition Pool. Each design has advantages and disadvantages you need to consider as you plan your deployment

The single Standard Edition pool is the simplest deployment approach and supports up to around 5000 users. In the SE pool, you have a single server that runs both OCS Standard Edition and SQL Server Express. You have no options over this database - the setup wizard installs the database and provides you no method of using a separate database. This design limits the scalability of your pool, and provides no fault tolerance. Figure 2 shows this pool design. This design is appropriate for smaller deployments, particularly those that are just IM and Presence.

Figure 2

Single Standard Edition Server

SQL Server Express

Standard Edition Pool

SQL and OCS Services
Co-located on Single Machine

No High Availability
Scalability Limited

The Consolidated Enterprise Edition design is Microsoft's recommended approach for deploying OCS 2007 R2. This design requires two or more Front End Servers running, a hardware load balancer and a back end SQL Server (preferably implemented as a fail over cluster). In this design, the Enterprise Edition (EE) servers are identical and support all the features of OCS. This design provides good scalability - just add more EE servers to handle more users, as well as high availability - a single EE server or one node of the SQL database server can fail and your service continues.

The number of users supported for your design will be a factor of the hardware platform and actual usage. You should use Microsoft's deployment planning tools to estimate performance and required hardware platform. And if you are considering implementing an Expanded Enterprise design - either get some consultancy support, or do a lot of practicing in the lab and develop scripts to deploy your OCS pool into production.

Deployment Planning Tools

To assist the planning, Microsoft has created a couple different planning tools. The first, the OCS Planning tool, will help you to design your deployment based on your specific requirements. You provide information about your deployment including the number of users and their usage profile, and the tool identifies a recommended topology and provides details on likely hardware needed to support your deployment.

Deployment Planning Tools, continued

To assist in capacity planning for your proposed deployment, Microsoft has created another tool, the OCS Capacity Planning Toolkit. This toolkit contains tools and documentation. These can simplify your hardware planning. It should also help improve your ability to verify and manage the performance of your intended Office Communications Server 2007 deployment.

While planning your OCS deployment, consider how you will monitor and manage the system. Will you just use the OCS native tools, will you choose to add on an additional management system such as Microsoft's Systems Center Operations Manager, or will you look to a monitoring and management service to keep OCS up and running? Consider what downstream management tools you will need, and plan for their deployment. Think about user provisioning and deprovisioning- this can be challenging in larger deployments.

Virtualized OCS

Many organizations are currently moving services to a virtualized platform. Virtualization products such as Microsoft Hyper-V, VMware VSphere, etc are being used increasingly.

OCS, with its requirement for a large number of servers, might appear to be a great candidate for virtualization. Anecdotal evidence exists to show that OCS can run in a virtualized environment; however the key is what Microsoft will support. Microsoft supports some, but not all roles. However Microsoft is expected to ramp up its support for full OCS virtualization in 2010.

As noted in the OCS Team Blog (http://communicationsserverteam.com/archive/2009/05/13/488.aspx), Microsoft does support server virtualization for OCS, however not for all roles and features.

Basically, anything except those components carrying audio or video is supported in a virtualized environment.

Thus a front end server in an expanded Enterprise Architecture would be supported, as would a Standard Edition Pool were voice and audio were not used and turned off.

Deploying OCS

Once you have completed your planning it's time to deploy OCS in your environment. Incorporate some or all of the following steps:

Prepare the Active Directory
Has to be done before you can deploy OCS.

Deploy OCS 2007 for internal Use
This step implements your pool (Using SE or EE as needed) and client applications.

Deploy Edge Servers for External Access
This step, which may also include deploying the Director role, enables external communication between your users and other remote users, federated users and possibly to external pubic Instant Messaging users.

Deploy Communicator Web Access
This is an optional step and may not be required in your environment.

Deploying Monitoring and Archiving
Ideally you should deploy these servers as part of deploying your pool, but they are optional and are sometimes installed later.

Deploying Dial-In Conferencing
This is another optional deployment feature.

Deploying Enterprise Voice
This final step is also optional.

Consider what downstream management tools you will need, and plan for their deployment. Think about user provisioning and deprovisioning- this can be challenging in larger deployments.

OCS features will soon move beyond PBX interoperability and remote call control. By 2010, OCS will be positioned to completely replace the corporate PBX.

Deploying OCS, continued

If you are deploying Enterprise voice, you also need to determine how you will do PSTN interoperability and how you will provide Emergency Services coverage. If you are deploying in a Branch office scenario, you also need to determine an approach to Branch Office survivability (i.e. what happens if your WAN link to the pool goes down) . The Microsoft document OCS 2007 R2 Deploying Enterprise Voice provides further information.

With OCS, you can use voice in three ways:

Internally only
Use OCS client tools to talk/view other OCS users.

PBX Interoperability
Leverage the existing PBX, routing calls to/from the PSTN via the PBX.

OCS As your PBX
Route calls to/from PSTN either via a SIP cloud provider or through a media gateway to your PSTN provider.

Microsoft is slowly changing its strategy and recommendations regarding OCS as a PBX replacement. The gradual shift which is expected to be complete by the time OCS 2010 ships in late 2010, moves OCS from a focus of PBX Interoperability and remote call control, to one of complete replacement of the PBX by OCS.

Deployment Testing and Trial

Microsoft has created several great tools to help you to test your deployment, both initially and once it's fully implemented.

The Validation Wizard
Looks at key aspects of your actual deployment of OCS and points out errors.

The Best Practices Analyser (BPA)
Performs a detailed health check of your OCS infrastructure and reports on issues found. You can use the BPA tool to determine the health of your deployment and to help you troubleshoot specific issues.

For Enterprise Voice, additional testing tools include the VOIP Test tool and the Deployment Validation Tool (DVT).

After deploying your OCS infrastructure and, prior to wide scale use, conduct user trials. This will help to ensure you have OCS fully configured for your use, and will give you some assurance that your design will handle the planned capacity. Up to around 500 users will provide great data and insights in to potential problems.

Monitoring OCS

Monitoring OCS 2007 is done at several levels. First, monitor the individual servers in your deployment. Then, monitor the overall end-to-end service being delivered. Monitoring can be accomplished in a number of different ways by using traditional Windows Server tools including performance monitor, network monitor, by using the OCS 2007 Monitoring Server, or by using some 3rd party monitoring solution.

Microsoft also provides additional OCS tools to help you to monitor your deployment, including the Deployment Validation Tool.

Monitoring OCS

Basic Monitoring

For basic monitoring you are looking at least initially for four key measurements on each server:

CPU utilization
Particularly for servers handling audio or video traffic, this is a key statistic to watch. You should aim to keep CPU usage below an average in the 60-80% range. If your OCS servers are constantly running above this range, it might indicate you lack capacity to handle peak usage and could use more CPU power in that server.

Disk usage
On EE pool servers, disc usage should be low - most of the disk I/O for OCS occurs on the SQL Server system. For SE servers that also run SQL, you need a good disk subsystem that would include hardware raid and fast discs. The same is true for EE Back End SQL Servers. In general, you want the disk subsystem to be no more than around 60-65% utilization. For many servers, particularly for 64-bit SQL servers, adding more memory can reduce disk access as you can get the entire database into RAM.

Memory
With the advent of x64 support, you can provide OCS with lots of RAM thus eliminating memory bottlenecks. And by adding RAM, you can often reduce the number of I/Os done by your system thanks to caching. Microsoft recommends 8GB for all roles, so ensure you have at least this much in every OCS server. Depending on the configuration of your system and actual load, additional memory may help. Monitor the amount of free memory, and pages per second. If free memory is low or if paging is over 100/sec for sustained periods look at increasing the amount of RAM.

Network
For many organizations, network bandwidth is going to be a key factor to monitor, particularly for deployments making use of any audio or video. You need to ensure your network is right-sized and you have enough bandwidth where you need it. If you are using conferencing or voice, you also need to engineer your network using tools such as QOS, to optimise it for A\V streams.

For A/V streams, you need to reduce the network delay to under 150ms (between endpoints), and to keep packet loss and jitter low. While the codecs built into OCS clients attempt to mitigate against bad performance you need adequate bandwidth and a well-engineered network, especially if you implement Enterprise voice. In terms of network utilization, you should look for Ethernet links to be below 60% utilization.

In addition to these measurements, OCS provides over 50 additional Performance objects, with hundreds of additional settings you can monitor. These counters can provide additional information about the performance of your OCS service. Some Interesting OCS performance counters include:

LC:SIP-01-Peers\SIP-000-Connections Active - Monitored on a front end server tells you how many active sessions you have.

LC:SIP-01-Peers\ SIP-008-Received Bytes\sec and LC:SIP-01-Peers\ SIP-008-Sent Bytes\sec
Shows how much SIP traffic is being sent/received. Monitor this for any abnormally high (or low) values

LC:UCSRV-00-DBStore\Usrv-002 Queue Latency and LC:USDrv-00-DBStore\User-000-Queue Depth - These counters show how long it's taking to get back end data requests services. High queue lengths and high latency numbers indicate an issue with your back end SQL database.

Start to capture these key performance statistics as you begin your deployment. You need to establish a baseline. Then going on, monitor against that baseline and investigate the changes as they occur.

Typically this will need drilling down in to the hundreds of performance counters. In addition to using normal Windows service monitoring tools (e.g. Performance Monitor), Microsoft have issued two OCS Server roles you can implement: OCS Monitoring Server and OCS Archive server.

The monitoring server is used to monitor particularly A/V services in your OCS deployment; the OCS Archive Server is used to archive Instant Messaging (typically for compliance reasons).

OCS provides over 50 additional Performance objects, with hundreds of additional settings you can monitor. These counters can provide additional information about the performance of your OCS service.

As your deployment progresses and usage grows, you need to update your configuration- managing corporate users is an on-going task in all OCS deployments.

Monitoring OCS, continued

The OCS Monitoring server is new with OCS R2. In OCS RTM, Microsoft created a Quality of Experience (QOE) Server and with the R2 release has refocused this to become the OCS Monitoring Server. With OCS RTM, the OCS Archiving server sent Call Detail Records to the Archiving server for analysis, but with R2, these CDRs are sent to the Monitoring Server (leaving the Archiving server to just do IM archiving).

The OCS Monitoring server collects numerical data indicating the media quality on your network and end-points, as well as usage information on Voice over IP (VoIP) calls, IM messages, audio/video conversations, meetings, application sharing, and file transfers.

For large OCS 2007 deployments, you would typically install the Monitoring Server on its own server, although there are some supported co-location options:

Co-locate the monitoring server with an SE server
For smaller deployments, this means running your SE pool and the monitoring server on the same system (although you do need a SQL Server specifically for the Monitoring Service)

Co-locate the monitoring server with your Archiving server
For larger deployments this means running both services on a single box. You will, of course, need SQL instances for both servers.

Managing and Troubleshooting OCS

There are two separate aspects of managing OCS: managing the configuration of OCS in your organization and managing OCS Users. As your deployment progresses and usage grows, you need to update your configuration. Managing users is an on-going task in all OCS deployments.

Much of the OCS configuration management can be done from the OCS MMC Snap-in. See Figure 3 - OCS MMC for an example of this snap-in. From here you can manage most OCS settings, and get a high level view of your deployment and how it's performing. You can view per-server performance reporting, details of the database as well as some key settings.
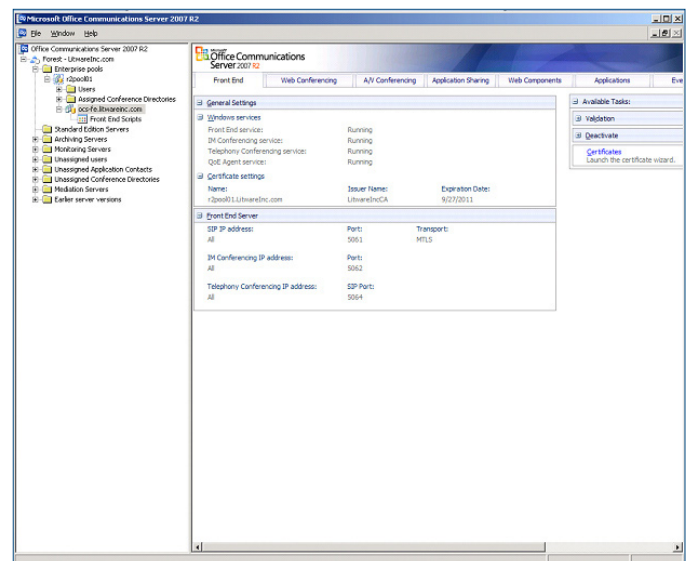

Figure 3: OCS MMC

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Looking at the problems posted to the OCS newsgroups, there are a set of issues that seem to be more common. These issues most often include Certificates and DNS-related problems.

Managing and Troubleshooting OCS, continued

In addition to the MMC, you may need to adjust some settings via the registry or Group policies, for example the A/V ports that should be enabled. Other settings, such as Address Book Configuration, are done via WMI - you can either use the built-in WBEM Test tool, or write some simple PowerShell scripts. Day to Day user management can be done manually by using the Active Directory Users and Computers, and the OCS MMC Snap-in. However, a better approach would be to create scripts, for example using PowerShell.

Looking at the problems posted to the OCS newsgroups, there are a set of issues that seem to be more common. According to Microsoft, the two most frequent OCS issues involve:

Certificates:
Certificates are required for all OCS activities, both client-to-server (and onwards to other clients) and server-to-server. The complexity of your PKI grows if you are in a multi-domain or multi-forest scenario. Plan your PKI carefully and ensure you monitor things like certificate expiry. The built-in certificate wizard works well for most roles - and has significantly improved this aspect.

Make sure you read the OCS 2007 R2 Deploying Certificates document which describes how to go about obtaining and deploying the digital certificates that OCS requires. Certificates need to be deployed to all the servers in your organization. But as OCS will not run without these being properly configured, these issues are easy to diagnose and are usually not a problem. You do need to manage the expiry and replacement of these certificates. Certificate errors are logged into the event log which provides adequate information to identify and resolve the issue. You also need to ensure that your client systems are configured to trust any Certificate Authority that issued a server's certificate. Microsoft recommends you use UC Certified public CA but you can use internally issued certs which are typically a lot cheaper. You need to ensure these are configured on all your client computers, typically via auto-enrolment.

DNS:
DNS is particularly a problem for client auto-discovery of a pool. The usual cause is missing or incorrectly configured SRV records. Ensure you have a good plan for deploying the correct DNS records in both your internal and external DNS namespace(s). Also, ensure you monitor these records to ensure any errors are quickly picked up. OCS uses DNS both for client auto-discovery and for server to server communications. DNS is pretty fundamental to the smooth operation of OCS thus these issues are ones you normally resolve during the initial deployment. For client auto-discovery to work, the client creates an SRV record lookup for a service running inside a SIP domain. For example, if you were to logon to Communicator as rebecca@cookham.net, Communicator would first look for _sipinternaltls._tcp. cookham.net.

This SRV record points to either a SE server or to an EE pool. Once Communicator knows where the pool is, it can proceed to logon. In large multi-pool deployments, these DNS point to just one of several pools. The pool pointed to uses Active Directory to redirect the client to the correct pool as needed. For remote and federated users, this redirection function can be carried out by a Director server. Like most applications, OCS is configured based on server names which are resolved at run time via DNS. This enables you to change the IP addressing scheme in your network and not have that affect OCS Operations. The one exception is that for telephony integration, OCS Mediation Servers are configured with the IP address of the associated media gateway. You need to ensure each and every OCS server is properly registered in your internal DNS and that your external DNS is configured to point to your edge servers. As noted earlier, these records are fundamental to OCS, so you typically resolve them as you first deploy your pool/edge/telephony features.

In addition, you typically find that managing users is an on-going task. Not only do you need to provision/de-provision them (enable/disable them to use OCS, etc), but you need to support them as they use OCS. And, as with most complex applications you need to guard against other Admins fixing things. All too often, other admins try to "fix" things – getting rid of DNS records that look odd for example. Ensure that all changes made result in re-running validation tests and the Best Practice Analyzer.
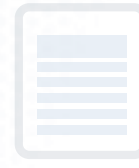
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The Azaleos Solution

Azaleos Corporation provides the benefits of hosted e-mail and collaboration services for organizations that can't or won't allow their data to reside outside the datacenter. Azaleos' 24X7 remotely managed services for Microsoft Exchange, SharePoint, Active Directory, Office Communications Server, and BlackBerry Enterprise Server keep information on-premise and under IT control, while uptime, maintenance, and support is handled by Microsoft certified experts in its network operations centers (NOC). The Azaleos management solution includes troubleshooting, patches/update/hot fix management, virtual or physical server environment options, storage management, and migration & deployment services.

Using patented ViewX and SecureX technology developed by Azaleos specifically to remotely monitor and manage Microsoft Messaging and Unified Communications infrastructures, the company's network operations center experts can find and fix issues before users or IT are even aware that a problem exists.

ViewX
Combines remote monitoring technology with next generation graphical reporting capabilities for real-time visualization of system data. Azaleos technicians do not see e-mail content, but do receive up to 5000 data points from your systems every minute. This allows us to proactively manage your environment according to pre-defined service level agreements (SLA)

SecureX
Remote command and control management system that enables Azaleos NOC technicians to troubleshoot and fix issues in the system environment. This patent-pending technology enables logged, auditable, repeatable, scripted, remote command execution between the Azaleos NOC and on-premise systems.

Azaleos solutions are risk-free and proven to deliver unmatched uptime, reliability, and performance. By deploying standardized best practices, Azaleos services are fast and easy to implement and scale to support large and geographically distributed organizations. Azaleos managed services reduce overall system complexity for IT and ensure increased operational/cost efficiencies and control which enable your IT resources to be better and more cost-effectively utilized supporting core business functions and new initiatives.

Azaleos' Managed Office Communications Server (OCS) Services assure the health, security and stability of your Unified Communications system (IM/Presence, Voice/Video/Web Conferencing and Telephony), identifying OCS performance and reliability issues remotely while proactively reducing IT support & maintenance costs.

About Azaleos
Azaleos Corporation provides 24X7 remotely managed services for enterprises with on-premise installations of Microsoft Exchange Server, SharePoint, Active Directory, Office Communications Server and BlackBerry Enterprise Server.   The unique Azaleos management solution is serviced by Microsoft certified experts who proactively manage the environment 24x7x365, finding and fixing issues before users or IT are even aware that a problem exists. The Azaleos management solution includes trouble shooting, patches/update/hot fix management, virtual or physical server environment options, storage management and migration services.

Azaleos also offers these additional services: Managed Archiving Services, Managed Filtering (AV/AS, content & image control) Services, Migration and Deployment Services and Business Continuity Services.

The Azaleos solution is proven and risk-free & delivers unmatched uptime, reliability, and performance. A nationally managed Microsoft Gold Certified partner, Azaleos is one of Microsoft's top 35 partners in the US.