1.0 OVERVIEW

This Application Guide focuses on FAX within Microsoft environments, specifically Exchange Unified Messaging (UM) - a key application within the larger sphere of Unified Communications (UC).

This document will clarify how faxing, considered to be an integral component of any UM architecture, is implemented in environments where key Microsoft infrastructure solutions including Exchange, UM, Office Communications Server (OCS) are involved. More specifically, it shows how Sagemcom's XMediusFAX IP fax server solution which supports the robust and standardized T.38 FoIP protocol is positioned to be the application of choice when operating within these environments.

In addition to the role of XMediusFAX within the Exchange 2010 UM environment, this application guide also sheds light on environments where XMediusFAX and the OCS 2007 application co-exist. Although Microsoft OCS provides users with a rich set of UC functions such as presence, chat, e-mail, voice mail and other capabilities, the sending and receiving of faxes using T.38 is currently not supported. As such, this document also provides guidelines to circumvent this known limitation within a given fax deployment.

Section 2.0 of this document provides details regarding the integration evolution of XMediusFAX with the Microsoft technology environment. Section 3.0 and associated subsections touch on some of the key deployment scenarios to help differentiate the capabilities provided by a standalone XMediusFAX + Exchange solution versus an integrated XMediusFAX + UM deployment. Section 4 addresses some advanced network considerations for the co-existence of XMediusFAX and Microsoft technologies within unique architectural environments. In section 5, the reader is provided some guidance by matching key business requirements with specific deployment scenarios that address them. Finally, section 6 provides an overall conclusion to the guide.

Table 1 below summarizes the fax capabilities provided by various product offerings as applicable to inbound and outbound faxing. References to various scenarios within the table highlight specific deployments that are documented in Section 3.

Product Offering	Inbound Faxing	Outbound Faxing
XMediusFAX & Exchange 2007/2010 Server	Fax Supported via XMediusFAX (See Scenario A –Section 3.3)	Fax Supported via XMediusFAX (See Scenario C – Section 3.5)
Exchange 2007 Unified Messaging	Native Microsoft Fax Support	Fax Not Supported
Exchange 2010 Unified Messaging	Fax Not Supported	Fax Not Supported
XMediusFAX & Exchange 2010 Unified Messaging	Fax Supported via XMediusFAX (See Scenario B – Section 3.4)	Fax Supported via XMediusFAX (Scenario C – Section 3.5)

Table 1: Microsoft & Sagemcom – Fax Support Summary

2.0 INTEGRATION EVOLUTION - XMEDIUSFAX & MICROSOFT'S EXCHANGE SERVER

XMediusFAX has been deployed alongside Microsoft products, including Microsoft Exchange for many years. Within this Microsoft technology environment, XMediusFAX offers several unique capabilities related to the integration of Microsoft Exchange and Active Directory Services. For example, there is no need to install, configure and maintain any proprietary connectors within Exchange. User management through Active Directory is simple yet powerful, requiring no schema extension or data synchronization between the fax server and AD.

With the introduction of Microsoft's Exchange Server 2010 UM platform, fax functionality has been given a new focus. Certified partners have been called upon to design and deliver 3rd party fax solutions to complement the Exchange 2010 UM offering. The previously embedded inbound fax functionality offered in Exchange 2007 UM has been retired in Exchange 2010 UM and replaced by specific partner fax solutions deemed to be certified as interoperable with Exchange 2010 UM.

Sagemcom(1) has taken a leadership position by providing fundamental contributions to the Microsoft fax specifications. It is among the few partners to have their fax solution undergo and pass the stringent interoperability specification testing stipulated by Microsoft and conducted by an independent certification body. With its XMediusFAX Release 6.5, Sagemcom has gone beyond parity with basic fax functionality previously supported with Exchange 2007 by delivering value added features when coupled with Exchange 2010 UM. XMediusFAX provides an enhanced feature set comprising outbound faxing, fax archiving, process automation, and advanced inbound routing to deliver a richer and more complete fax experience.(2)

By officially complying with the Microsoft UM specification and the associated underlying prescribed requirements, the XMediusFAX fax server solution offers:

Interoperability with SIP TCP: As OCS and Exchange only do VoIP via SIP TCP, XMediusFAX promises "natural" integration with a Microsoft based voice infrastructure as it matures (i.e. OCS adding T.38 support).

Future proofing with TCP + TLS: By positioning Microsoft based voice infrastructures "for flexible yet secure deployments", Microsoft has chosen SIP TCP and stipulated that all voice products MUST support encryption. As such, XMediusFAX supports encrypted/secure SIP signaling over TLS.

Secure email communications with SMTP + TLS: To comply with Microsoft's strict requirements on security, support for encrypted/secure delivery of fax email notifications has been added within XMediusFAX making it the most secure fax server on the market.

(1) Sagemcom is a Gold Certified Partner

(2) "For more details, please refer to Sagemcom's Solution Brief entitled "XMediusFAX in a Microsoft Exchange Server 2010 Unified Messaging Environment"

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3.0 DEPLOYMENT SCENARIOS

Some of the various key deployment scenarios shown in Table 1 of section 1.0 require more in-depth analysis in order to shed light on the specifics of the call flow, architectural details, as well as the highlights of the solution. The document examines deployment scenarios that have a Microsoft Exchange UM element as a core functionality within their inbound faxing requirements versus those which do not. In both cases, the caveat regarding the non support of T.38 protocol based faxing by IP-PBXs such as Microsoft's OCS requires further elaboration to ensure appreciation of how a fax call is established.

As well, the incremental value added functionality provided by XMediusFAX in regards to outbound faxing completes the overall analysis. Agnostic to whether a UM or non-UM environment is at the core of the deployment, XMediusFAX manages outbound faxing in the same manner, due to the fact that Microsoft UM (2007 or 2010) never supported outbound faxing.

Sections 3.3 through 3.5 provide the information necessary to highlight the key deployment scenarios and use the graphic reference model of section 3.1 as its basis.

3.1 REFERENCE MODEL

Figure 1 illustrates the various elements that may be comprised within an XMediusFAX and Microsoft environment and serves as a reference model upon which various deployment scenarios will be detailed. As such, specific deployment scenarios (see Sections 3.3 through 3.5) may utilize some or all the components shown within the reference model.

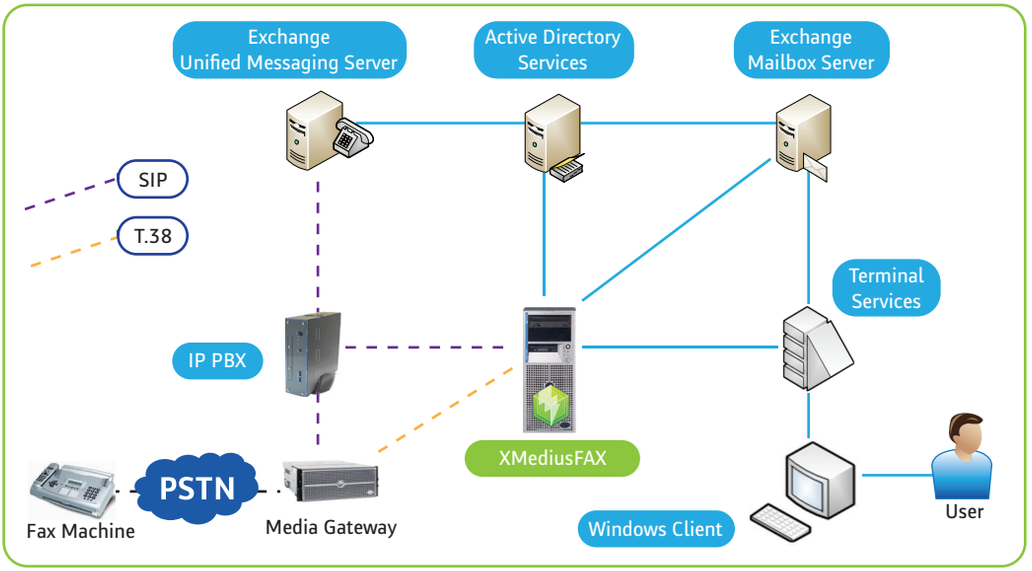

Figure 1: Reference Model – XMediusFAX Integrated in a Microsoft Exchange Environment

3.2 REFERENCE MODEL – NETWORK ELEMENT LEGEND

The following icons shown below consist of the main elements within the reference model illustrated in Figure 1. Understanding the role of each element within the model serves to better appreciate the interrelationship of XMediusFAX and Microsoft elements as well as their dependency on other network elements within differing fax deployment scenarios (See 3.3 through 3.5).

Exchange Server Unified Messaging: Combines voice & e-mail messaging and interacts with specific 3rd party fax solutions to include fax messages into a single messaging infrastructure which can be accessed through a desktop or mobile device.

Active Directory Services: Serves as a central authentication domain where policies and security related to objects and users can be applied by a network administrator. XMediusFAX fully leverages Active Directory without requiring schema extensions.

IP PBX: Replaces the traditional PBX or phone system and gives employees an extension number, the ability to conference, transfer and dial other colleagues. All calls are sent via data packets over a VoIP based data network instead of the traditional phone network. With the use of a Media Gateway, existing phone lines can be connected to the IP PBX enabling phone calls via a regular PSTN line. Special care needs to be taken when this network element is Microsoft's OCS.

Exchange Mailbox Server: The Mailbox server role hosts mailbox databases, which contain users' mailboxes. A user's mailbox can contain emails, voicemails and faxes. In addition, all mail flow inside the organization and delivery of messages to a recipient's mailbox are provided by the Hub Transport server role. Both roles are considered within this network element.

XMediusFAX: Sagemcom's fax server solution certified as interoperable with Microsoft's Exchange 2010 Unified Messaging solution. Operates on Windows server platform, including Windows 2008 R2 and supports virtualization technologies, like Hyper-V and VMware.

Terminal Services: Provides the ability to host multiple, simultaneous client sessions on a Microsoft Windows Server platform. A Terminal Server is capable of directly hosting compatible multi-user client desktops and applications such as Microsoft Outlook. XMediusFAX clients are fully compatible with Microsoft Terminal Services.

Media Gateway: A translation device or service that converts digital media streams between disparate telecommunications networks. Performs translation of TDM traffic from the remote fax machine into an IP based traffic suitable for the UM server and XMediusFAX and vice versa. Inbound call routing is typically performed by analyzing the called number or DID and some models perform CNG tone detection.

Windows Client: Client based desktop operating system (OS) used in conjunction with XMediusFAX client components. Other compatible OS systems include Windows 7, Vista, 2003/XP/2000 SP4.

3.3 DEPLOYMENT SCENARIO A: XMEDIUSFAX & EXCHANGE 2007/2010 SERVER - INBOUND FAXING

Figure 2 illustrates the inbound faxing scenario where all processing is performed by XMediusFAX. In this deployment, all aspects of inbound fax traffic including security, routing logic, storage and user notification of received faxes is processed and managed by XMediusFAX. In this call flow, the UM Server element is not utilized; Active Directory is used to determine the recipient[s] and the Exchange Mailbox Server provides the repository for the user's faxes.

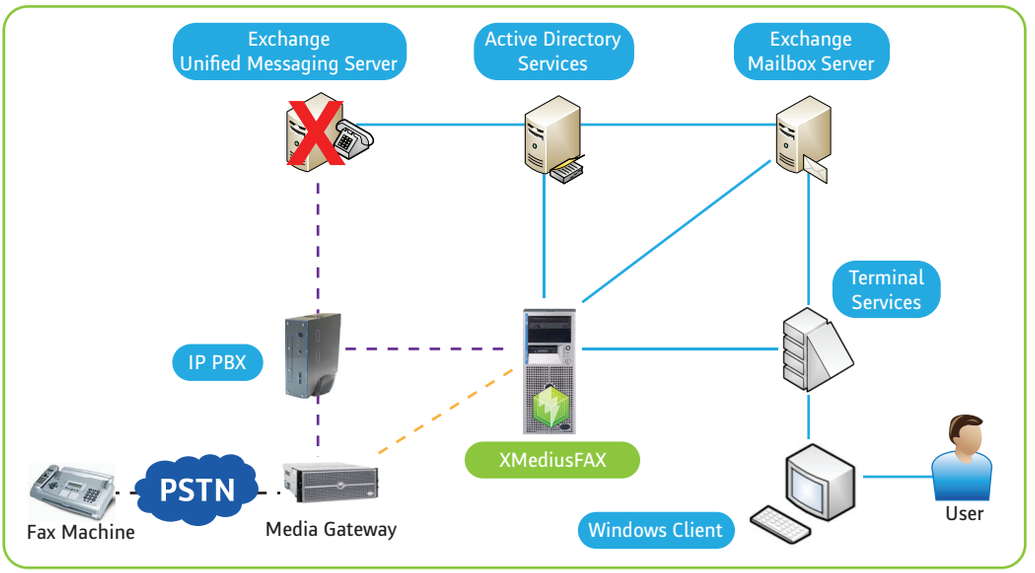

Figure 2: Standard Exchange Server - Inbound Faxing

Call Flow	•Inbound fax calls are routed by the IP PBX to the XMediusFAX server. •XMediusFAX will receive the fax, archive it and determine the recipients by querying Active Directory and then relay the fax notification to the Exchange Mailbox Server. •Users receive the fax in their Outlook Inbox or any other UM client such as a mobile device.
Architectural Details	•Recipients are typically determined based on the dialed-number (DID) of the received fax. Although other methods are possible, DIDs provide the highest degree of reliability. •In the case where Microsoft's OCS is the IP PBX, the Media Gateway must divert the call and bypass OCS whereby calls received on any fax DID numbers are immediately routed to the XMediusFAX server. •Fax detection technologies allow certain Media Gateways to detect CNG tones. Calls identified as a fax are directed to the XMediusFAX server, providing the user with a single number for both voice and fax calls.
Solution Highlights	•Faxes can be routed to multiples users as well as multiple recipient types (i.e. shared network resources, Exchange public folders, printers). •Notifications and user experience can be tailored according to specific customer requirements. •The above scenario is possible with any version of Microsoft Exchange Server. •Exchange is leveraged as a means of storage for the users faxes.

Table 2: Deployment Details for XMediusFAX and Exchange 2007 / 2010 Server - Inbound Faxing

3.4 DEPLOYMENT SCENARIO B: XMEDIUSFAX & EXCHANGE 2010 UNIFIED MESSAGING - INBOUND FAXING

Figure 3 illustrates the inbound faxing scenario where all inbound fax traffic transits through the UM Server. In this deployment, the UM Server provides both security and routing logic, whereas the storage and user notification of received faxes are provided by XMediusFAX. In this call flow, all elements within the reference model play an active role in this deployment and similar to Scenario A, Active Directory is used to determine the recipient and the Exchange Mailbox Server provides the repository for the user's received faxes.

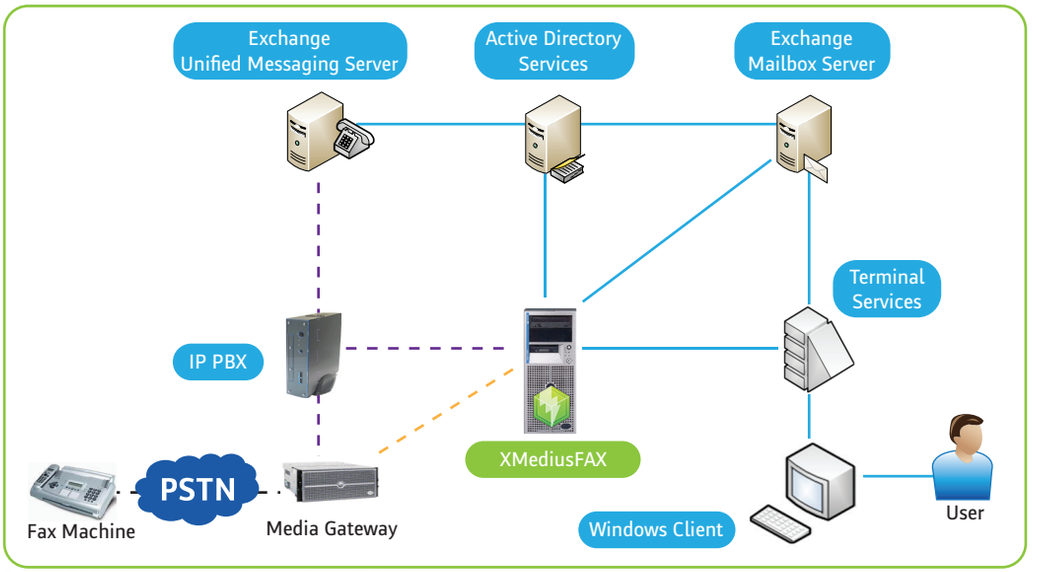

Figure 3: Exchange 2010 UM - Inbound Faxing

Call Flow	•Inbound fax calls are initially routed by the IP PBX to a user's extension. When the call is transferred to their voicemail, it will be automatically routed to the Microsoft Exchange UM Server. •Exchange UM detects that the call is a fax, queries Active Directory to determine whether the intended recipient of the call is provisioned for fax and issues a fax call referral request to the Media Gateway. •The Media Gateway transfers the call to the XMediusFAX server. •XMediusFAX will receive the fax, archive it, and then relay the fax notification to the Exchange Mailbox Server. •Users receive the fax in their Outlook Inbox or any other UM client such as a mobile device.
Architectural Details	•In the case where Microsoft's OCS is the IP PBX, the Media Gateway must divert the call and bypass OCS whereby calls received on any fax DID numbers are immediately routed to the UM server. •Fax detection technologies allow certain Media Gateways to detect CNG tones. Calls identified as a fax are immediately directed to the UM server, providing the user with a single number for both voice and fax calls.
Solution Highlights	•Faxes can only be routed to a specified individual, which is determined by the Exchange UM Server. •Drop in solution for customers familiar and satisfied with faxing capabilities offered in Exchange UM 2007. Minimal network configuration changes are required and entails little fax server management. •The above scenario provides an identical user experience as offered by Exchange UM 2007 and does not require any user re-training. •The above scenario is only possible with Exchange 2010 UM.

Table 3: Deployment Details for XMediusFAX and Exchange 2010 UM - Inbound Faxing

3.5 DEPLOYMENT SCENARIO C: XMEDIUSFAX AND MICROSOFT EXCHANGE - OUTBOUND FAXING

Figure 4 illustrates the outbound faxing scenario where all processing is performed by XMediusFAX. In this deployment, outbound fax traffic originates from a Microsoft Outlook client application and is processed by XMediusFAX. All aspects of outbound fax traffic including security, storage and notification of sent faxes are provided by XMediusFAX. In this call flow, the UM Server element is not utilized, the Exchange Mailbox Server delivers the outbound messages to XMediusFAX, Active Directory is used to find the properties of the sender and the Exchange Mailbox Server provides the repository for the user's sent fax.

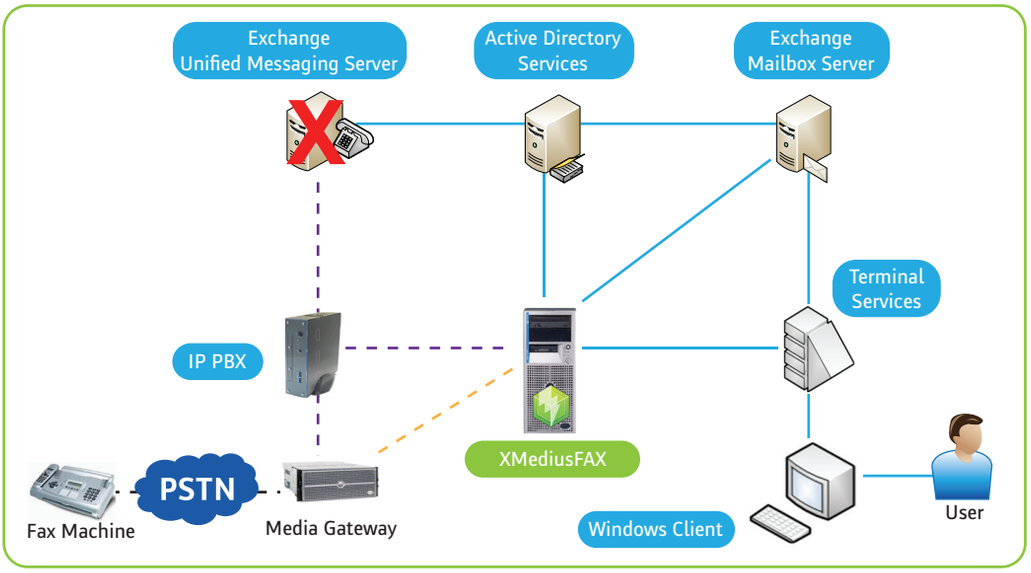

Figure 4: Outbound Faxing with Exchange

Call Flow	•User composes an outbound fax using Outlook or any other UM client such as a mobile device. •Exchange server relays message to the XMediusFAX Server. •Based on the user's Active Directory properties (AD lookup), XMediusFAX identifies specific parameters such as the cover sheet to use and other fax privileges. •XMediusFAX establishes communication with the IP PBX which in turn routes the call to the Media Gateway. •The fax is transmitted and, once complete, a notification is sent back to the user.
Architectural Details	•In the case where Microsoft's OCS is the IP PBX, XMediusFAX must establish the call directly with the Media Gateway. •Complex UC deployments may require the configuration of dial-plans specified within XMediusFAX.
Solution Highlights	•XMediusFAX can assign different faxing parameters and privileges based on various properties within Active Directory (i.e., Department, Organizational Unit). •Notifications and user experience can be tailored according to specific customer requirements. •Call flow possible with any version of Microsoft Exchange Server.

Table 4: Deployment Details for XMediusFAX and Microsoft Exchange - Outbound Faxing

4.0 ADVANCED NETWORK CONSIDERATIONS

By adhering to Microsoft's specifications for interoperability with Exchange 2010 UM, XMediusFAX complies with evolving networking architectures present within fax landscapes. Some examples of architectural options are briefly discussed in the sub-sections below.

4.0 HOSTED VS. NON-HOSTED SERVICE

The different fax scenarios within sections 3.3 through 3.5 illustrated deployments where all infrastructure elements were local (i.e., non-hosted). Alternative scenarios, specifically where some or all the infrastructure is hosted, are possible. By officially complying with the Microsoft UM specification and the associated underlying prescribed requirements, the XMediusFAX fax server solution can be deployed in a variety of different models. In using standardized and secure communications such as SIP TCP/TLS and SMTP TLS, XMediusFAX addresses current and evolving customer requirements.

4.2 SIP TRUNKING

SIP Trunks in effect replace the Media Gateway as the means of providing connectivity to the PSTN (Public Switched Telephone Network). In general, the use of SIP Trunks has no impact on the scenarios depicted within sections 3.3 through 3.5. However, in the case where Microsoft's OCS is the IP PBX, the sending and receiving of faxes must circumvent OCS. Special care must be take to ensure that the SIP is fully compliant with the T.38 protocol as it is the only standardized method for reliably carrying fax across an IP network.

5.0 REQUIREMENTS & RECOMMENDATIONS

Recommended deployment scenarios associated with specific business requirements are summarized in table 5 below.

Key Business Requirements	Recommended Deployment
Require business process workflow, advanced capabilities such as complex routing and archiving	Scenario A (see Figure 2 in section 3.3)
Replace existing UM 2007 capabilities no longer available in UM 2010	Scenario B (see Figure 3 in section 3.4)
Enable outbound desktop faxing using Unified Messaging	Scenario C (see Figure 4 in section 3.5)

Table 5: Deployment Scenarios - Key Requirement vs. Recommendation

6.0 CONCLUSION

With the introduction of the Exchange 2010 UM platform, Microsoft has created a new dynamic within the fax landscape. By retiring the native inbound-only fax functionality that it provided in an earlier version, Microsoft has provided the opportunity for 3rd party fax specialists to integrate into a Microsoft UM network deployment. Having undergone the stringent requirements set forth by Microsoft in its Fax Partner Interoperability Specification, Sagemcom via its XMediusFAX fax server solution is among a select group of companies to have its solution tested and certified to work with Exchange 2010 UM.

XMediusFAX leverages IP Telephony and unified communications (UC) systems to enhance productivity, collaboration, and ROI by integrating fax on the desktop. Regardless of the deployment scenario, XMediusFAX can be made to easily interoperate with its adjoining elements to ensure that fax functionality is preserved as before, or is enhanced. For those simply interested in inbound fax functionality as they previously enjoyed with Exchange 2007 UM, an upgrade to Exchange 2010 UM in conjunction with XMediusFAX can be regarded as "drop-in" solution with minimal overhead. In such cases, the UM platform is an integral part of the call flow and ultimately initiates the fax on its journey through the network to its end destination- the user's mailbox. However, in standard Microsoft Exchange Server deployment scenarios which do not have a UM component, XMediusFAX becomes the key traffic flow director for inbound faxes. For either case, outbound faxing, which was not available for Exchange 2007 UM (or in Exchange 2010 UM), is regarded as a value added component to faxing. By adopting a more specialized 3rd party fax solution such as XMediusFAX, a richer and more complete faxing experience can be attained.

The interoperability of several vendor products within an overall deployment can often be riddled with challenges and require workarounds to obtain the best possible user experience. In a unified communications environment, fax functionality may have be managed in order to overcome certain obstacles. Such is the case in deployments where Microsoft's OCS platform happens to be the IP- PBX within the network. The OCS's current non-support of the ITU standardized T.38 protocol poses challenges, however, these can be mitigated by using a Media Gateway which can divert the call and bypass the OCS component completely. Fax detection technologies to detect CNG tones within certain select Media Gateways make it possible to have a single number for both voice and fax calls, enabling users to access their fax messages together with their e-mail and voice mail using Microsoft Outlook client or a mobile device. With XMediusFAX as the core component for faxing within any Microsoft UM/UC deployment, users are afforded a more dedicated and specialized fax server solution delivering complete inbound and outbound functionality, without the need to install, configure and maintain any proprietary connectors within Exchange.

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