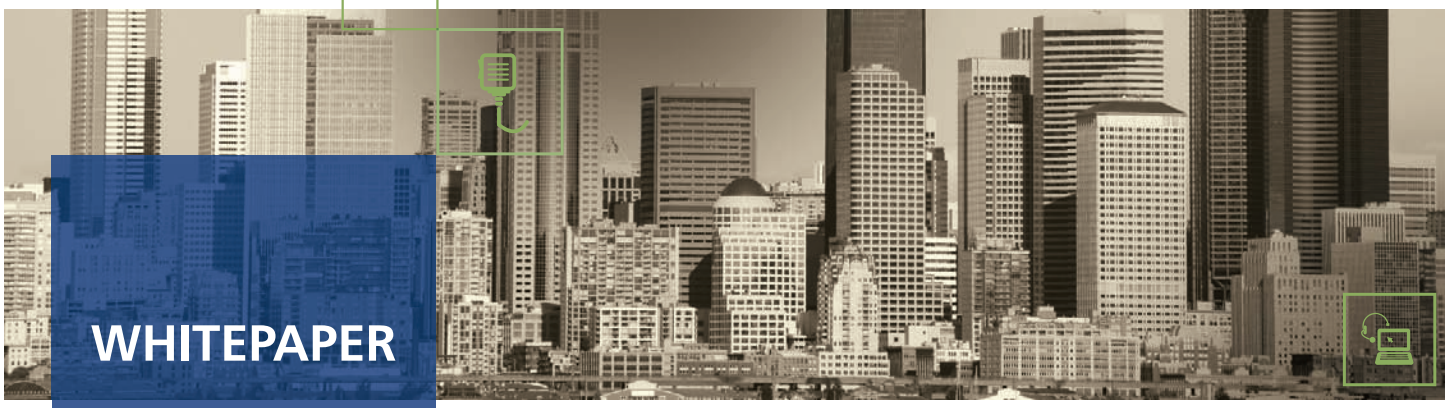
TWISTEDPAIR
Rethink Critical Communications



WHITEPAPER

The Compelling Case for Twisted Pair's WAVE® Communicator for Microsoft® Lync™

CONTENTS

Introduction

Over the last few years, the concept of unified communications (UC) has become increasingly well-understood in office-based and occasional mobile scenarios (e.g. business travel and 'working from home'). The combination of a compelling user experience, measurable productivity gains and a disruptive pricing model[1] is attractive to firms looking for ways to speed decision making and improve workflow while reducing cost.

UC systems like Microsoft® Lync™ derive part of their value from being a single-solution replacement for various communications 'silos' such as the enterprise PBX and video conferencing. Therefore, part of the process of deploying and migrating to a UC system is to integrate it with existing communications systems and workflows. Some of the communications silos will ultimately be replaced by UC, but some will remain within the corporate communications infrastructure and will be integrated with the UC system. The unique attributes of two-way radio systems and commercial Push-to-Talk (PTT) networks, such as iDEN, make them a particular case in point. When PTT communications are a component of the enterprise communications mix, part of the migration strategy to UC should include consideration of an IP-radio interface system such as the WAVE® Communicator for Microsoft® Lync™ (WCL) from Twisted Pair.

Twisted Pair recently announced the general availability of WCL, an application that is tightly integrated with Microsoft Lync. WCL extends the reach of Lync by adding a communications panel directly to the Lync desktop environment so that office-based workers and mobile workers on smartphones, tablets or two-way radios can simply and securely communicate via voice or text messaging. The exchange of valuable information such as status, presence and location is also enabled.

The purpose of this paper is to examine the utility of and business case for the extension of Microsoft Lync to two-way radio systems and other communications technologies using Twisted Pair's WAVE Communicator for Microsoft Lync.

[1] *There have been a range of studies conducted on this topic—see for example* ***http://www.ucstrategies.com/uc-resources/unified-communications-budgeting.aspx.*** *For the purposes of this discussion, I am comparing the broadly accepted per-user purchase cost metric for PBX systems of $1,000 (including a telephone) vs. that of a higher-functioning UC system at approximately $300 per user. Hosted, or cloud-based, UC could drive that figure below $100 per user on an annually recurring basis.*

The Value of Two-Way Radio Communications in Government and Commerce

When most people think of mobile communications in the 21st century they think of the ubiquitous cellular telephone. However, the use of radio systems in specific scenarios is so well-established that it often goes unnoticed. A full explanation of the usage of radio communications is outside the scope of this paper, [2] but in order to appreciate the benefits of WCL it is useful to understand the situations where the use of radio is preferred over cellular phones.

The main categories of the usage of radio by government and commercial entities are:

- emergency services, e.g. police, fire, ambulance, rescue;
- physical security, national security and military operations;
- field mobile technicians, e.g. installation, repair and utility workers;
- commercial transportation, e.g. trucking, taxis, trains, buses, airports and seaports;
- event management and hospitality;
- logistics, warehousing and retail, i.e. where staff operate over a wide physical area;
- construction and maintenance.

For the most part, radio has not been replaced by cellular in these use cases for very good practical reasons:

- Immediacy: Mainstream radio users (e.g. firefighters) are usually fully engaged in the task at hand, so the notion of pausing to look up a number and dial is out of the question.
- Availability: The types of scenarios where radio excels means that radio users have a low tolerance for dropped calls or 'no signal'—common experiences for the cellular user.
- Broadcast communications: Radio usage is most beneficial when everyone in a certain group or team might need to hear all messages (e.g. 'Customer in aisle 5 needs assistance.').

In recent years, mobile carriers have tried to supplant traditional two-way radios with their own PTT services, with moderate success at best. Clearly, PTT cellular networks such as the Sprint (formerly Nextel) Direct Connect service and Qualcomm's QChat technology have replaced some traditional radio usage. The 'half-duplex'[3] and broadcast modes of operation of PTT systems are sufficiently different from general cellular and Public Switched Telephone Networks (PSTN) that they can be considered to be a type of radio system implemented on a cellular network. Traditional two-way radio systems, however, have attributes that make them superior to PTT networks in certain scenarios.

Like conventional cellular networks, most PTT services have limitations in that they operate within relatively short range of a fixed communications tower. These towers have a finite capacity, rendering them unusable in some situations:

- Operations in locations that may be outside the coverage of the supporting cellular networks, e.g. forestry operations.
- Where the range of communications is great, possibly extending beyond the coverage of a single PTT network provider, and the communicators may be moving at considerable speed, e.g. aircraft communications, marine communications, military operations.

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[2] *For a greater understanding of two way radio, please see:* ***http://en.wikipedia.org/wiki/Two-way_radio****.*

[3] *In 'full-duplex' mode, both parties can speak at once, as is usually the case in telephony. In 'half-duplex' mode, only one person can speak at a time—this is the default mode of operation in radio and PTT systems.*

- In certain transient high-density usage situations where cellular networks may be overwhelmed, e.g. sports stadiums, major emergencies and other significant events, because many people in a relatively small area are trying to communicate all at once.

The unique attributes and requirements of these types of scenarios make two-way radio communications indispensable. In addition, the requirement for radio users to communicate with users on other networks is indisputable—this is where systems such as the WAVE Communicator for Microsoft Lync from Twisted Pair bring immense value to the communications infrastructure.

The Main and Differentiating Features of Microsoft Lync

Like many other UC systems, Microsoft Lync features tightly integrated multi-modal communications linked via a compelling value proposition that is created by a single, globally-routable user identity (e.g. billg@microsoft.com) coupled with indicators of the user's presence and availability. Key features of Lync include:

- asynchronous, text-based communications, i.e. instant messaging, email, group/persistent chat;
- synchronous, real-time communications, i.e. voice and video;
- application sharing and data collaboration;
- multi-party conferencing supporting voice, video and data collaboration;
- a common set of platform services that supports all communications modalities and endpoints:
  - Single user directory, supporting single-sign-on
  - Single routing rule-base repository
  - Single point of management, monitoring and administration.

While a full description of Lync is outside the scope of this paper; it is useful to understand the high-level features and benefits of the platform to fully appreciate some of the scenarios and value propositions to be discussed later in this paper. What differentiates Lync from other UC products is that it bears the hallmarks of a mature, built-from-scratch platform with a broad partner ecosystem:

- Full multi-modal remote access for roaming users, e.g. telecommuters and business travellers.
- Inter-company Federation, i.e. the ability to use the same rich communications modalities with business contacts in other companies that have deployed Lync.
- A robust real-time failover strategy that will tolerate data center failure as well as WAN failure at the branch office.
- Tight integration with other Microsoft Office products (e.g. Sharepoint, Outlook, etc.).
- A strong third-party partner and platform integration program:
  - Pre-certified voice integration with PSTN/PBX/SIP trunking[4]
  - Video integration with popular video conferencing systems[5]
  - Application integration (CEBP[6]) via a rich API set
  - Gateway integration for Lotus Sametime and XMPP-based systems
  - Integration with popular consumer IM and Presence services.[7]

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[4] *For the most up to date information, see: http://technet.microsoft.com/en-us/lync/gg131938*
[5] *Including Polycom, LifeSize, Tandberg, Cisco Telepresence, Radvision.*
[6] *Communications Enabled Business Processes, i.e. the ability to integrate communications into 'line of business' applications.*
[7] *Windows Live Messenger, AOL Instant Messenger, Yahoo Instant Messenger, Google Talk*

While office-based workforces are well-served by UC, the attributes of most UC modalities are not fully implemented on devices used by mobile workers.[8] The limitations of UC on mobile devices are due to:

- the limited form factor of the mobile device, i.e. small screen area, limited user interface;
- the limited bandwidth, battery life and processing power (all three are closely related);
- the communications use cases in which mobile workers are typically engaged, i.e. executing tasks that limit the attention that can be given to complex interactions;
- ambient light conditions for those working outdoors.

These challenges limit communications between UC users and mobile workers primarily to the voice modality. Microsoft Lync has good mobile phone integration for conventional voice calls however Lync voice communications are fundamentally full-duplex with no mechanism for 'floor control' [9]— consequently, Lync has no native capability to interoperate with radio or PTT devices. Therefore, to integrate a network of Lync users with a network of half-duplex radio users requires a special gateway with floor control and 'PTT key' features implemented on the Lync Communicator client. This is a critical part of the value that is provided by Twisted Pair's WAVE Communicator for Microsoft Lync.

Features of WAVE Communicator for Microsoft Lync

Having evaluated the compelling features, strengths, and weaknesses of radio communications and Microsoft Lync for enterprise communications, the value of the WAVE Communicator for Microsoft Lync solution starts to become self-evident. While a full description of WAVE is outside the scope of this paper, it is useful to understand the high-level features and capabilities of the application to fully appreciate the scenarios discussed later in this paper.

The value begins with savings from the connection of traditional non-IP devices, such as two-way radio networks, with the IP network. This provides economies of scale for the enterprise by consolidating these networks under the control of the IT department, providing cost savings and better oversight of the overall communications infrastructure.

By providing a radio channel interface and floor control for Lync, WAVE Communicator for Microsoft Lync combines the richness of Lync-based communications with the immediacy and command-and-control attributes of traditional radio and PTT systems. WCL fully integrates mobile workers who are using PTT devices into the UC environment, providing true unified communications and interoperability. In addition, WAVE offers a full suite of end-user applications beyond WCL. Of particular interest is the WAVE Mobile Communicator, an application for mobile devices that enables a smartphone or tablet to seamlessly and securely communicate with radio users and office-based members of their team. This is an invaluable feature for mobile workers who may need to communicate on several radio networks and/or consolidate multiple devices into a single multi-purpose device.

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[8] *However, see the section later that discusses emerging technologies such as tablets, smartphones and 4G/LTE.*

[9] *Floor control' is the temporary allocation of the 'right' to speak in order that two or more users are not talking at the same time. This is required when a full-duplex system is interfaced with a half-duplex system within which transmissions are mutually exclusive.*

WAVE is a scalable and cost-effective solution that enables staff to use familiar systems, thereby eliminating retraining, re-equipment costs and downtime. By deploying WCL, Lync users gain access to a number of valuable capabilities:

- Access to traditionally unreachable devices that are part of proprietary radio systems, paging systems and other non-IP networks
- A secure, instant access connection between smartphones, Microsoft Lync users and users of one or more radio networks
- The ability to consolidate all communications infrastructure under IT control, reducing convoluted network operations
- The ability to push a user's presence from Microsoft Lync onto a radio channel
- Integration of users' physical location (provided by GPS-enabled radios or smartphones) into the communications mix, including mapping of users' geo-locations within WCL.

A Compelling Business Case for WAVE Communicator for Microsoft Lync

The deployment of WCL provides a number of compelling business opportunities to organizations, some of which are more obvious than others.

Actors in a Combined Lync / Mobile Communications Network

In every organization that uses a radio network, there are typically three types of employees:

- Non-mobile/office staff: Staff involved in traditional organizational/administrative duties that do not require the use of a radio. These workers occasionally may need to communicate with mobile staff that rely on radios as their primary communications device.
- Mobile staff: Staff whose main occupation is essentially mobile in nature and whose primary means of communication is a radio device. These staff members may also rely on mobile phones for non-critical business-related communications.
- Hybrid staff: This category includes office-based managerial/coordination staff with a frequent need to communicate with mobile workers (e.g. call center operators, command-and-control center staff) as well as supervisory staff who periodically work in the mobile domain (e.g. Fire Chiefs).

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While all three categories of staff will benefit from the integration of Lync and radio networks via WCL, it is the third category that gains the most benefit.

At its most fundamental level, the WCL value proposition is that it enables radio network users to communicate with Lync users. The communications industry has a 'rule of thumb' (Metcalfe's Law [10]) that defines the value of a network of a given size using a mathematical formula:

Network value = n * (n - 1) / 2
[where 'n' is the number of devices (or users) in the network]

The 'network value' is the number of all the potential connections that could be created between each of the 'n' users in the network. For a company of 1,000 employees, half of whom are Lync users and half of whom are radio users, the value of each of the two networks on a standalone basis is:

500*(500-1)/2 = 124,750

The value of the two networks as separate entities is the sum of the value of the two networks (i.e. 249,500). However, by joining the networks, the network value becomes:

1,000*(1,000-1)/2 = 499,500

Thus the value of the combined network increases non-linearly as the number of possible connections increases for each user. Apart from the intuitive benefits of connecting radio and UC networks that would otherwise be unconnected, from a mathematical perspective the value of WCL is an exponential increase in communications capability.

Improving Organizational Efficiency and Reducing Costs

The deployment of WCL creates widespread efficiencies for organizations by providing broad-based access to individuals, teams and groups coupled with immediate, secure communications regardless of the devices they are using, their location, or the network to which they are connected. By streamlining communications between non-mobile and mobile staff, organizations can:

- provide always-on, real-time communications for groups and teams in everyday and situational scenarios;
- eliminate communications bottlenecks and opportunities for misunderstanding emanating from the relaying of messages;
- improve response time and customer satisfaction by connecting customer-facing staff with mobile staff;
- increase the operational efficiency and economic utility of expensive and scarce mobile assets;
- reduce communications costs by eliminating toll-based network usage.

As mentioned above, the use of the WAVE platform can improve communications between radio networks of different types by bridging those networks, as well as providing mobile staff with a multi-purpose smartphone device that can access multiple radio networks and the Lync network.

Smartphone integration with Lync and GPS-enabled radio sets provides an immense opportunity to optimize routing and dispatch of high-value mobile resources. The rich APIs created by Microsoft and Twisted Pair offer customers the ability to create

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[10] *For a complete description of this see:* ***http://en.wikipedia.org/wiki/Metcalfe's_law***

custom command-and-control and dispatch systems, enabling the integration of location data from mobile devices with rich on-line mapping interfaces and real-time traffic data. [11]

The recent emergence of smartphones and, particularly, 'tablets' as a new class of mobile device is enabling a wave of innovation in commercial applications and use cases. Mobile workers now have access to:

- low-cost mobile computing power;
- high speed 4G radio data networks such as LTE;
- unified communications modalities other than voice;
- massive cloud-based data sets (e.g. satellite imagery, transactional databases, etc.);
- sources of unstructured data (e.g. documents on the Internet, SharePoint sites, etc.) accessible by search engines;
- GPS-based location data;
- high-resolution imaging devices and displays;
- 'peripheral' devices such as RFID tag readers, laser-rangefinders, etc.;
- the 'app store' innovation model.

These innovations and technologies will rapidly revolutionize the way that we conduct mobile operations in ways we cannot yet imagine.

Crisis Management

Every organization experiences a crisis from time to time. It is during a crisis that the communication needs of an organization change dramatically from everyday usage: everyone needs an increased level of communication and interaction to resolve the crisis. The urgency of some situations only serves to compound the required level of interaction. Whereas executive/strategic level staff often leaves the management of day-to-day operations to mid-level managers, during a crisis the degree of executive supervision and oversight naturally intensifies. If for no other reason, the level of authority required to make important decisions (e.g. reprioritization and reallocation of key resources) quickly draws executive-level staff into the management of the crisis and this requires them to be in the communications loop. The key features of Lync—particularly person-centric, presence-driven communications and ad-hoc conferencing—provide the enormous value over traditional telephony in such situations. The ability of Lync to provide full multi-modal access to decision makers who may be off-site or at home when the crisis unfolds is of critical importance. Combining the person-centric attributes of Lync with the team-centric attributes of two-way radio makes the combination of Lync and WAVE extremely powerful.

Emergency and National Security Crises

Clearly, certain types of organizations, such as the emergency services, the military and national security services, exist to deal with crises of varying types. Routine crises (e.g. a one-alarm fire) are managed by day-to-day managers. Those of a non-routine nature (e.g. a 10-alarm fire) will require much greater levels of coordination, including cross-organizational liaison, such as:

- coordination with medical facilities;
- evacuation of buildings at risk and the housing of evacuees;
- rerouting of traffic and infrastructure;
- deployment of additional agencies such as utility companies.

'Combining the person-centric attributes of Lync with the team-centric attributes of two-way radio makes the combination of Lync and WAVE extremely powerful.'

[11] *E.g. Bing maps, Google maps, etc.*

The ability to connect key decision makers to 'first responders,' as well as to conduct rapid cross-organizational liaison and collaboration, are some of the ways in which Microsoft Lync and the WAVE family of products deliver capabilities that significantly enhance communications.

The gravity of some situations merits the highest level of executive supervision. The iconic White House Situation Room picture taken during the Osama Bin Laden interdiction operation, 5/1/2011 (left).

Non-Emergency Crises

Apart from public safety and the military, in general, organizations with mobile staff are no more likely to suffer a crisis than those without. However, the operational nature of mobile staff means that it is they who are more likely to be dealing with the crisis and who will need additional coordination and direction from supervisory staff. These crisis situations may range from a localized operational outage (e.g. the failure of a critical production process) to a system-wide failure (e.g. an ice storm that cuts power to millions of homes). This is where the communications systems used by executive staff must be capable of being reconfigured or extended to allow communications to flow freely and securely between mobile and non-mobile staff as well as to/from external partners and resources. Once again, WCL provides unmatched performance in such situations.

A Tipping Point for UC Deployment

Many organizations may have pre-purchased Lync as part of their Microsoft Enterprise Agreement but have yet to deploy it. Alternately, they may have deployed Office Communications Server and have not yet started the upgrade process. Part of the reason for this may be that other projects are competing for staff priority and budget allocations, or perhaps organizational inertia plays a role. However, in consideration of the benefits discussed above, the combined ROI of deploying Lync integrated with radio and PTT networks, using the latest smartphones and tablet devices, all connected via the deployment of WCL, should be carefully considered. The deployment of these systems together has the potential to exponentially increase field efficiency and overall organizational capability while reducing cost in a way that few other projects could.

Summary

In key operational scenarios, the provision of communications to operational staff via mobile networks is of immense value. For non-mobile workers, the richness and immediacy of Microsoft Lync is providing new value to the communications-oriented processes of a rapidly growing number of commercial and government entities. Early adopters of Lync include Global 500 organizations that conduct multi-national operations around the clock in a diverse range of challenging environments and who already significantly depend on radio and PTT networks.

For those deploying Microsoft Lync alongside traditional radio and PTT networks, WAVE Communicator for Microsoft Lync is a key enabler that exponentially increases the value of both premises-based and mobile communication networks. Return on investment will be rapidly achieved in day-to-day operations via the optimization of communications channels and the increased utilization of key mobile assets. Furthermore, any organization that is required to respond to unforeseen eventualities will easily be able to measure the value of the combination of WCL and Lync in time and money saved, opportunities preserved, customers retained, resources conserved and capital investments protected.

Let's Talk

We work closely with the public sector, the defense industry, and commercial entities around the world. How can we help you?

twistpair.com
info@twistpair.com
+1 (206) 442-2101

ABOUT TWISTED PAIR

Twisted Pair is the recognized leader in critical communications. Our WAVE software empowers your mobile workforce with critical communication applications for secure, real-time collaboration anywhere on any device. Built on a battle-tested communications interoperability platform, WAVE delivers voice, video, location, presence and other forms of data deployed as an enterprise product or cloud-based service throughout commercial, public sector and defense organizations. WAVE has been proven in thousands of the most complex deployments around the world to help integrate and control a truly unified communications system so that office-based and mobile workers can simply talk, make decisions and act.

CORPORATE HEADQUARTERS
3131 Elliott Avenue
Suite 200
Seattle, WA 98121 USA
(T) +1.206.442.2101
(F) +1.206.812.0737
(E) sales@twistpair.com

EMEA
Davidson House
Forbury Square
Reading, RG1 3EU
(T) +44.118.900.1110
(F) +44.118.900.1111
(E) sales.emea@twistpair.com

APAC
2 St Peters St
Glenelg East, Adelaide
South Australia, 5045
(T) +61.(08).8376.5905
(F) +61.(08).8125.6570
(E) sales.apac@twistpair.com