# Unified Communications for Healthcare Organizations

*Identifying High Value Communications Improvements*

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**Abstract**
Healthcare is a communication intensive industry.   Recent technology advancements, known as Unified Communications (UC) create the opportunity for significant improvements in the communication elements of Healthcare processes,  ranging across inpatient, outpatient and administrative roles.  This White Paper identifies those opportunities and suggests how UC can deliver those improvements to Healthcare Organizations, aligned with natural organizational groupings, including:
- Inpatient care provider communications, consultations, and treatment management
- Inpatient administrative communications and coordination of services and throughput
- Outpatient communications, appointment coordination, and resource scheduling
- Remote patient contact, including post-discharge and chronic condition management activities
- Hospital and clinic administration and management effectiveness

Selected customer examples are highlighted in the appropriate sections.
Application and technical requirements are defined for each of the UC solutions;  Microsoft Lync 2010 is reviewed as a UC platform for implementation of the suggested UC improvements.

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## Communications in Healthcare

Communications is vital to effective Healthcare delivery and operations. Communications is key to timely and accurate flow of patient-related information, to the consultative process for optimal care, and to the effective delivery of administrative information.

New communications methods and technologies are providing breakthrough opportunities to improve Healthcare delivery by streamlining communication-intensive processes. When communication-based delays, errors, and rework are reduced or eliminated, improvements can be realized in care quality, in care access, in cost of care, and in the satisfaction of both the providers and recipients of care.

These new communications methods and technologies are known as Unified Communications and are now being delivered affordably and broadly to the marketplace.

## What is Unified Communications?

Unified Communications (UC) is well-defined as "communications integrated to optimize Healthcare processes."[1] The starting point is the accessibility of new technologies. The traditional communication tools in healthcare of voice, pagers, fax, and some e-mail on dedicated machines are being dramatically changed and improved.

- Voice communications on wired telephones are being displaced by Instant Messaging (IM) when a live call is not needed; by electronic health records (EHRs), databases, and image sharing on computers when the voice call was previously used to get information from another location; and by voice or video on a mobile device when the consultation requires personal interaction or relationship.
- Notifications and call-backs on pagers are being displaced by mobile devices with presence status (display of who is on-shift and available, sometimes with location information); and with IM to ask for someone's attention and for a possible text chat session. The mobile devices reduce the usual delays due to missed call-backs.
- Fax machines are being replaced by web portals for secure information access.
- E-mail messages can now be retrieved on mobile devices, to avoid delays, or are being replaced by access to web pages and information portals accessible from mobile devices.

All of these communication improvements are being enhanced in UC by the assistance of intelligent software to locate resources, to assist the user's communications, and to log or record transactions.

## Identifying UC Opportunities in Healthcare

The opportunities for realizing the benefits of UC can be identified by a review of the procedures, workflows and processes within a Healthcare organization. Examples of UC improvements are shown in each of the following six areas. Note that all areas will require careful attention to regulatory requirements, such as for patient information privacy (such as required by HIPAA) and industry practices adherence (such as inspected by the Joint Commission).

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[1] Paraphrase of UCStrategies.com definition: "Communications integrated to optimize business processes."

## Inpatient Processes

Inpatient processes can be categorized into three broad groups, each of which is communications intensive in specific, distinct ways.

- ■ The Admit, Discharge, Transfer (ADT) and Reimbursement cycle.  The key attribute of this process group is the number of approvals required for completion.  While ADT is not directly involved in care delivery, delays in these processes can impact on timeliness of care delivery, can result in extended patient stays and risks, and can deter patient throughput and increase costs.  In the past, much of this communication was conducted via telephone calls, paper documents, face-to-face interactions.   Processes in this cycle include:

  | Admit | Transfer | Discharge | Reimburse |
  |-------|----------|-----------|-----------|

  With UC, often in combination with electronic ADT or EHR systems, these communications can be automated and facilitated with software.  In one regional medical center, discharge notification calls are made automatically, with computer-spoken information, to the physicians, the various ancillary departments, and the patient's family to facilitate the process; responses automatically update the database and only the remaining exceptions must be manually addressed; average discharge time and thus average patient stay, was reduced by 4 hours.  The reimbursement phase can also be improved with automation and facilitation of the dialog with the patient or the patient's third-party payor.  By embedding communications tools directly into the claims software interfaces, collections department communications can be significantly streamlined.  Follow-up calls or messages can be automated and responses can be routed back to the initiating collections agent or to an available substitute.
  UC benefits in these processes are primarily the reduction of delays in patient throughput which can shorten patient stay, lowering costs, and may allow for increased occupancy rates, thereby increasing facility revenues or reimbursements.  Benefits may also include improved flow at admissions, especially from the Emergency Department where backlogs can be avoided.

- ■ The Treatment Management cycle.  The key attributes of this process group are the giving of orders that define the plan, delivering the care elements, monitoring and charting patient progress with consultation as needed, adjusting the treatment plan when indicated, implementing a transfer or discharge decision, and tracking quality assurance.   Clearly, this is communication intensive, but much of that communication is now occurring through electronic monitoring and through recording and charting in the Electronic Medical Record (EMR).  Thus, many legacy communications delays or difficulties have already been eliminated, such as by delivering up-to-date results to the attending physician via the EMR rather than the physician needing to make a telephone call for information.  Processes in this cycle include:

  | Implement Treatment Plan | Consultation | Adjust Treatment Plan | Charting | Quality Assurance |
  |--------------------------|--------------|-----------------------|----------|-------------------|

  However, many communications are still required, especially at shift transfers of responsibility (or handoffs) and when exceptions arise which require adjustments to the treatment plan.  UC is

already assisting many hospitals in this area.

First, we see the use of mobile devices, computers on wheels, and nursing station computers to locate the exact resource for the needed communication based on the Physician on-call and on-service assignments, other nursing assignments, and the ancillary staff availability.  Once the software finds the right resource, the communications can proceed in the best method.  Increasingly, care providers are using asynchronous text (Instant Messaging – IM or cellular Short Message Service – SMS) rather than a phone call.  Efficient and accurate synchronous communications can be a major improvement to the care process, avoiding the interruptions of synchronous or real-time communications while also providing a log of activity for cross-team or cross-shift reference.  When a phone call is needed between two or more team members, the software can find those professionals at the most convenient location or phone number, thus saving significant professional time and accelerating the care process.

An example of this inpatient team communication is [University Hospitals Bristol](), part of the National Health Service in the UK.  UHBristol integrated communications into their SharePoint-based intranet to provide immediate on-shift staff visibility (via presence services in Microsoft Office Communications Server – Lync) when managing services and bed assignments and when communicating between care providers.  Once the best available staff member is found, a single click can begin an instant messaging session or a voice call.  UHBristol reports improved bed utilization as well as more effective treatment management.

Second, when consultations require sharing of most types of visual information such as most lab or radiology results, UC can expand a voice call into an information sharing session, with the ability to jointly view the information while explaining or annotating that information.  The consultative session can be logged into the patient record.

The [Penza Cardiovascular Center]() is a specialty center providing 2,800 surgeries per year for 13 constituencies of the Russian Federation comprising 10 million people.  To improve consultations with the patient's local referring physician, Penza uses Microsoft Lync 2010 for IM, audio and video communications.  Remote physicians can join the consultation from their desktop computers.  Diagnostic imaging from a SharePoint data base is viewed and annotated using Lync meeting functionality.  Both patient care and patient experiences are improved.

UC benefits in these processes are primarily a reduction in the effort required to deliver the treatment plans; care providers spend less time in repetitive or redundant communications tasks and can often accelerate tasks such as shift handoffs.  The results can be more time for patient attention and, in some cases,  a reduction in the levels of shift overtime.   Also, since communication events can be logged automatically, regulatory and JC compliance is enhanced.

■ The Exception Management cycle.  Beyond the structured events of ADT and Treatment Management, inpatient care has many communications events driven by unplanned events or exceptions.  Examples include out-of-tolerance patient indicators, code calls for stat response teams, other types of alerts, and patient requests.   To date, these have been addressed effectively by audible alarms, by overhead paging, by hallway lights, and by electronic paging.  However, these methods have several challenges: the exception notification does not always reach the best, correct, or most proximate staff; and many of these tools are not two-way

solutions, so a timely response may not be assured and repetitive calling or alerting may be needed.

| Exceptional Result Notification | Alerts, Codes. Exceptions | Find Resources | Patient Requests | Shift Handoffs |

UC is significantly improving these processes with the application of software, presence indications, and mobile devices to find the best resource immediately and to send a secondary notification to that resource; mobile devices allow for two-way communication to confirm timely responses, or to start an escalation if the requested care team member cannot respond or declines the request.  When a care provider needs additional assistance or consultation, the UC tools already mentioned for ADT and treatment management are available to find and communicate with those team members.  Note that the current primary notification tools – audible and visual alerts – can remain in place for regulatory compliance, but UC will enhance the ability of the care providers to respond most appropriately.

UC benefits in these areas are primarily an improvement in patient care both through reduced response times to alerts and exceptions and through faster access to supportive or consultative resources.  Some reduction in errors is also a likely outcome from these UC improvements.  Also, since communication events can be logged automatically, regulatory and JC compliance is enhanced.

In summary, inpatient care is being significantly improved with Unified Communications tools.  These improvements are available immediately and are even more effective for those hospitals that are advanced on the EHR adoption scale, since UC solutions can take advantage of EHR information.  For example, current care provider assignments for each patient are available in the EHR to support all three of the process groups defined above.

## Outpatient Processes

Outpatient processes are, of course, much different from inpatient care delivery.  UC provides improvement opportunities for outpatient care delivery in several ways.   The processes most relevant to UC in Outpatient facilities are:

| Appointments | Schedules | Results |

- ◼ Appointment Management Processes:   A major challenge for outpatient facilities is to achieve the balance between the urgency of patient needs, the availability of facilities and staff, and the goal of maximizing the billable utilization rates.  This is clearly a communication-intensive process with plenty of challenges.  Most outpatient facilities use software systems to book the appointments and to track utilization.  However, patient communications is primarily via telephone calls.  Most outpatient facilities use tools that are part of their phone system, such as automatic call distribution or call center features, to manage the incoming calls.  Some use automatic reminder systems to call patients for confirmation prior to appointments.

UC is improving these processes by extending the options available for patient communications while also reducing the associated labor costs.  The primary new solution is to extend appointment making onto the web, accessible through patient PCs, tablets and smart phones.  With proper identification, the patient can log-in to schedule or adjust an appointment, with the option of clicking to speak directly to an appointments clerk.  Also, UC can be used for appointment reminders or adjustments via the patient's preferred notification – e-mail, cell phone text messages, or phone calls.

An example of this approach is [Care1st Health Plan](#) which serves more than 200,000 low income and disabled citizens in the Southern California area.  Care1st automated the appointment reminder and confirmation process using the out-dialing and speech recognition features of Microsoft Office Communications Server – Lync.  This enabled Care1st to triple the compliance rate and reimbursements for first-time patient examinations while also saving money by reducing staff time and mailing expenses from the prior manual methods.

UC benefits in these processes are primarily better utilization of facilities and staff resources, due to more effective scheduling and the reduction of unplanned cancellations.  In addition, clerical staff levels and costs are often reduced due to patient self-service via web or IVR.

■ Resource Scheduling and Team Communications:  In response to the varying levels of demand for patient appointments, various types of testing, and specialist interactions, the Outpatient facilities must also schedule their own staff so as to minimize waste and to match the availability and convenience of their employees.  This process has been automated by the appointment management software to varying degrees.

UC can enhance this process by extending the staffing scheduling system functions to the employees' and Physicians' mobile devices, enabling schedule access or schedule change requests directly to or from the user's preferred device, without costly manual intervention.
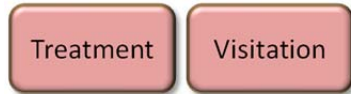
UC Benefits in this process area are primarily an optimization of staff time and of associated premium costs for overtime or unplanned callouts.  In addition, clerical staff levels and costs are often reduced due to scheduling self-service via web or mobile devices. Physicians gain options for better time utilization between outpatient, inpatient, educational and administrative tasks.

■ Results Communication:  Significant time and labor are spent delivering results of examinations and tests to patients.  Or course, there are cases when a direct physician discussion is the best form of communications, but the majority of cases require staff time to call the patient with the results, often involving leaving a message and connecting a call-back.

UC best practices replace most of these phone calls with a secure web portal so that patients can be alerted by e-mail to log into the portal to view their results, with a short interpretive commentary from the physician or other medical staff that explains the results.  Indications requiring a visit or follow up can link directly to the appointment system, as described above.

UC benefits in this area are primarily reductions in staff time and costs currently required to contact patients for results reporting.  Other benefits are possible, including better patient compliance with treatment plans and more effective patient communication with their care providers.

## Post-Treatment Care, Chronic Condition Management and Remote Care Delivery

Increasingly, Healthcare organizations seek to assist patients in properly and consistently implementing their post-treatment recovery plans, in effectively managing chronic conditions, or in remote care delivery.  This is done in two major process areas:



- ■ Patient Communications for Treatment Monitoring:  To date, this was primarily done with telephone calls from or to medical staff to confirm status or treatment progress.
  In the UC era, the options are dramatically expanding to deliver these services over the Internet.  As mentioned above, a secure web portal enables the patient to log-in to report their treatment progress or to alert their care provider that an exception has occurred.  Where appropriate, this web portal can become the communication channel by voice or video between the patient and the care provider.
  When physical examinations are required, UC provides the tools such that the patient increasingly is able to go to a facility nearest to them and still interact with their specialist, surgeon or other expert at a distant location via a video consultation assisted by a nurse or medical assistant at the patient's location.   This enables major reductions in health care costs by eliminating travel by the specialized physicians as well as increasing patient convenience which can be an incentive for timely and willing participation in the treatment programs.
  UC benefits in this process area are both the savings from reducing the staff time and costs currently required to contact patients by phone or e-mail and the likely improvements in treatment plan compliance for those patients who prefer and adopt the automated methods.
- ■ Field Visits and Home Care Processes:  Many reimbursable care activities require visiting nurses or other care providers to visit home-bound patients for treatment updates or monitoring.
  UC can provide both optimizations and cost reductions.   In all urban and suburban areas and in most rural areas, cellular phone services enable the exchange of information with mobile staff.  Schedule changes, time reporting, and patient information updates can now be delivered directly to the field staff mobile devices (PCs or smart phones); this reduces time and travel costs to return to the office for assignments, information or billings.
  In addition, there is increasing use of remote electronic video communications between care providers and the in-home patient to provide more frequent 'touches' with the patient for improved care and support of treatment programs.  Additionally, economical monitoring devices can be part of these remote interactions to provide real-time patient status data.
  UC benefits in these process areas come first from the reduction of field staff time and mileage needed to serve their home-bound patients, since cancellations and adjustments are known in advance; the time savings can be applied to expanding revenues or to reducing cost.  Patient care and satisfaction can be improved via access to the latest patient information.   Use of remote interaction technologies can improve treatment plans as well as reduce costs.

## Hospital and Clinic Management

Hospital and Clinical management are enabling and supporting roles that stand behind the successful medical care included in all the prior categories. These are the roles that facilitate the organizational, financial and physical environments in which and through which the Healthcare is delivered. Thus, it is essential that these roles also gain the benefits of UC. In fact, UC began with optimization of the business roles in most organizations, so is ready to support these roles in Healthcare Organizations. Three major processes can be supported:



- Administration: This team organizes the operations of the Healthcare facility and executes on key roles. These include executive oversight, policies, human resources, financial management, information and communications services, procurement/suppliers, and similar roles.
- Facilities: This team oversees the physical plant in which care is provided. This team is often very mobile, as they inspect, maintain and repair the facilities. Also, this team is very information-driven since they must work from and maintain master plant documentation.
- Fund-Raising, Marketing, and Public Relations: This team interfaces with the public to promote Health; to attract patients; and, depending on the type of facility, to attract donors who can supplement or expand the scope of the organization in areas such as new facilities, new services or research opportunities.
- Research: This team, while closely associated with the care providers, is grouped with management since they use similar communications tools. Specifically, research is very information driven and is a highly collaborative process, an area where UC can provide breakthroughs in effectiveness.

All four of these roles use multiple elements of UC in very proven ways:

- o Contact Management: Optimizing the connection to the right person (or a skilled substitute) for rapid approvals or transaction management. Keeping the executives in touch with employees and the public. Instant messaging and presence are key to this application, with effective integration between mobile devices and office environments. Integration to business applications and information and document processing is key.
- o Collaboration Acceleration: Providing tools that accelerate projects, decisions, policy making, and operational monitoring. This begins with easy communication between team members with presence and IM and extends to simple click-to-conference functions for desktop information sharing and group discussions.
- o Resource Location for Problem Resolution: Making it possible to find the best, available resource to solve problems or manage exceptions without delay. This is build on presence, directories, and smart search tools, with click-to-communicate and to solve the problem when the right resource is found.

- o   Mobile Information and Access:  Delivering to the mobile worker sets of information ranging from presence and directories to Healthcare organizational information such as financial or facilities data.   Of course, this is combined with other UC functions for rapid and effective task completion.
- o   Communication-enabled Portals or Applications:  Embedding communications functions into the computer screens that are used around the clock for admissions, collections, and external web pages so as to speed and streamline those tasks.

The results from applying these tools to management roles are broadly proven by cases studies across industry groups, and are now emerging as the new best practices in Healthcare.   Examples include:

- ■   Sullivan Nicholaides Pathology who automated the incident reporting system in their sample collection centers using Microsoft OCS/Lync integrated with Microsoft Dynamics to speed their response to patients during incidents and to improve incident reporting accuracy and tracking.
- ■   Cancer Care Ontario whose employees are improving their productivity in coordination of cancer services in Ontario, Canada, using Microsoft OCS/Lync; employees can now see presence and availability of other staff, including remote employees and have audio, video and web conferencing to improve coordination and tracking meetings.  Cost reductions ensued.
- ■   Schulman Associates, an independent review board for clinical trials, moved to Microsoft Office Communication Server (now Lync), for a 67% reduction in telephony costs.  The benefits to their business were even greater as employees could use presence and instant messaging for immediate interaction and could use video conferencing to meet the regulatory requirement for face-to-face review meetings without the time and expense of site-to-site travel.

UC benefits in these process areas are realized in lower cost per project, based on faster time to completion and less labor per project; in faster problem resolution which will lower the resultant losses of capacity or service; and in lower administrative costs via employee self-service, via remote work options to reduce facilities costs, and via improved meeting options to shorten meeting times and reduce travel between sites.

## Technology Requirements for UC Solutions in HealthCare

The UC technologies that enable the solutions described above vary based on the processes and the use cases, i.e. the Healthcare function and how the users will apply the technologies to accomplish their work in new, more effective ways.  Since there is a wide variation in the types of processes, it is very important to anticipate the technology requirements in advance to avoid conflicting, incompatible, or wasteful technology investments (see later section on UC Roadmap).

The consistent requirements theme across all processes and solutions is an integrated UC architecture that can be both an application development platform and a communications platform.  These integrated UC architectures are available today, especially from the new entrants and more innovative UC firms who realize the importance of a flexible platform and who are not or were not tied to an historical investment such as a PBX system as the basis for their UC architectures.

Also, it is important to note that only a few processes, primarily in Hospital and Clinic Management, are readily improved by deployment of "out of the box" UC packages.  Most standard UC packages are designed for office and management roles, not for Healthcare delivery; this reinforces the importance of a flexible and integrated UC architecture.

The following table presents technology requirements for the UC solutions described above.

| UC Solution | Technology Requirements |
|---|---|
| **Inpatient Solutions** | |
| Admit, Discharge, Transfer <br>  | Platform for automating communication steps.  Must include: (a) ability to support application modules that connect into the ADT and EHR databases to inform the communications; and (b) support for the best communication type for each step and user (e.g. automated calling/speech recognition or text for families; IM, e-mail, automated calling/speech recognition for physicians; ADT events for internal staff. |
| Treatment Management <br>  | Platform for integrating communication tools into the inpatient IT applications, such as the EHR, shift assignment databases, etc.  Basic level is to embed UC tools into the application screens for communications while reviewing patient status or during shift handoffs.  Advanced level extends UC tools to commonly used mobile devices – cellular and WiFi. |
| Exception Management <br>  | This solution requires support for information delivery to both cellular and WiFi mobile devices with accompanying communication tools to allow the user to accept or decline the notification and also to communicate as necessary to the situation.   Also requires ability to interfaces by standard or purpose-built modules with the numerous systems which generate patient- or process-related alerts. |
| **Outpatient Solutions** | |
| Appointment Management <br>  | Platform enabling common application modules supporting both web pages and interactive voice response / speech recognition (IVR) functions connected to the appointment system and databases, with ability for patient/caller to connect to available staff member via preferred mode – voice (from either web or IVR) or IM chat (web). |
| Resource Scheduling <br>  | Platform enabling common application modules supporting both web pages and interactive voice response / speech recognition (IVR) functions connected to the scheduling system and databases, with ability for employee, contractor, or physician  to connect to available staff member via preferred mode – voice (from either web or IVR) or IM chat (web). |
| Results Communication <br>  | Platform supporting primarily a web interface for results presentation, with proper security validation for use and access.  Optionally, provide similar functions on IVR/speech interface, though often may be difficult for patient to absorb the information audibly; possibly offer a fax option. |
| **Post Treatment Care** | |

| UC Solution | Technology Requirements |
|---|---|
| Treatment Monitoring | Platform enabling common application modules supporting both web pages and interactive voice response / speech recognition (IVR) functions connected to the treatment monitoring software and/or the EHR to enable patient updates with current results. Ability for patient/caller to connect to available staff member via preferred mode – voice (from either web or IVR) or IM chat (web). |
| Field Visits/Home Care | Basic level is to provide mobile UC client that is the equivalent of the office desktop for presence indication, IM/Chat, directory access, click to communicate functions. Advanced level is for a UC platform supporting application modules that interface the mobile device to the dispatch system and to the patient record/assignments system/databases. Video and data transmissions for remote caregiver interactions. |
| **Hospital/Clinic Mgt.** | |
| Administration | UC system that fully integrates to Hospital or Clinic desktop solutions including e-mail, calendar, tasks, IM, presence, and click-to-communicate. These functions should be seamless at desk or when mobile.<br>Ease of conferencing, and integration with delegates is of high value. |
| Facilities | In addition to Administration requirements (above), platform to integrate mobile devices to facilities databases and trouble ticket systems. |
| Fund-Raising, Marketing, PR | In addition to Administration requirements (above), platform to support both (a) active collaboration on projects or fund-raising (e.g. CRM features) including shared workspaces and file access; and (b) ability to organize communication campaigns via web, IM/Chat, calling or e-mail, both outbound and inbound. |
| Research | In addition to Administration requirements (above), platform to support secure persistent collaboration activities across local team and other entities (i.e. other Hospitals, Universities, etc.). Should include shared workspaces and file access. |

These are relatively high level requirements, but are sufficient to define the type of UC system needed for each solution category. When assembled into a roadmap of solutions for a specific Healthcare organization, the combined set of UC technology requirements will guide product and vendor selection.

It is important to note that replacement of the PBX that is currently installed in the Hospital or Clinic is not a requirement of any of the applications or UC solutions defined above. A new UC system can address the UC solutions and deliver the benefits much more quickly if the Healthcare organization does not spend 1 or 2 years in PBX replacement requirements, RFP-based selection, and migration to the new PBX system. It will be much more effective to migrate communications onto the UC system on a process by process, use case by use case basis and then determine what PBX functions still remain for eventual migration. In almost every case, a deferred PBX replacement results in significant savings.

## Creating a UC Roadmap for Your Healthcare Organization

By examining the solutions and benefits suggested in this white paper, those solutions which are most compelling, either as to needs or economics, can be selected for any specific Healthcare organization. Once the desired solutions are identified, sequence the solutions into a series of modular investments. Usually, each investment module can be done in 6- to 9-months, since each of the solutions suggested above will apply to a very specific process and involve a very specific set of users.  Modular investments are almost always less risky and have the advantage or returning benefits much sooner, which benefits can be applied to funding for the next investment module.

The main variable in most Healthcare organizations is whether to begin the UC Roadmap with the administrative, the clinical, or the patient-facings processes and solutions.  In general, beginning with the Administration Management roles, which can include both IT and the Chiefs of Service or Clinical Department heads who participate in management processes, will help the leadership better understand UC as they consider the investment modules for solutions in the clinical areas and the other administrative areas.

The multi-year sequence of UC solutions provides the basis for both budgeting and technology selection.

## Microsoft Lync as a Healthcare Communication Platform

In our opinion as independent UC Consultants, Microsoft Lync is a good example of the innovative UC solutions coming to the market today and is responsive to the requirements for the UC Healthcare solutions described in this paper.  The major attributes of Microsoft Lync supporting our analysis and conclusion are:

- ■ Microsoft Lync is a comprehensive communications platform:  All communication modules necessary for the complete Healthcare UC Solution set are included in the Microsoft Lync platform.  This includes all required modes of communications (Voice, IM, Presence, Persistent Chat, e-Mail (via Exchange), IVR with text-to-speech and speech recognition, conferencing via voice/web/video) available via both desktop and mobile devices.  Microsoft Lync also includes the integrations to the other systems as defined above including installed PBX systems, public networks for voice and internet communications, and Microsoft Office applications including Microsoft SharePoint for collaborative workspaces.
- ■ Microsoft Lync is a flexible applications platform:  Application Program Interfaces (APIs) are available to support a wide range of Communications-enabled Business Processes (CEBP), which is the general industry term for the types of application integrations defined in the solutions and requirements sections above.   The APIs include both "client" APIs, for building communication functions into desktop or mobile clients (such as EHR screens in Treatment Management), and "server" APIs, for building communication functions that integrate with server-based information resources or that support web portals and IVR functions (such as in Appointment Management, Resource Scheduling, or Treatment Monitoring).   Of course, Microsoft Lync integrates well with other Microsoft packages which are often part of the UC Solution, such as Active Directory, IIS/Silverlight web services, SQL databases, and more.

■ **Microsoft Lync supports both** <u>standard and customized UC solutions</u>: The same platform can support both the standard packages, such as might be used for Administration Management, and the customized modules, such as are required for most inpatient and outpatient solutions. This provides flexibility in managing the UC Roadmap and dramatically reduces the cost of the sequence of UC Roadmap investments.

To illustrate the application of these three broad categories, the table below specifies which functions are required for each of the solution areas described in the Technology Requirements section.

| UC Solution | Microsoft Lync Capabilities |
|---|---|
| **Inpatient Solutions** | |
| Admit, Discharge, Transfer | Applications platform to integrate with ADT and EHR databases. Communications platform for appropriate communication modes. |
| Treatment Management | Applications platform to integrate with applications and databases and to embed communications with application screens and mobile devices. Communications platform for appropriate communication modes. |
| Exception Management | Applications platform to integrate with notification events (from clinical devices) and to connect to/from users' mobile devices. Communications platform for appropriate communication modes. |
| **Outpatient Solutions** | |
| Appointment Management | Applications platform for web and IVR presentations/interactions. Communications platform to connect users/callers to clinic staff. |
| Resource Scheduling | Applications platform for web and IVR presentations/interactions. Communications platform to connect users/callers to clinic staff. |
| Results Communication | Applications platform for web and IVR presentations/interactions. Communications platform to connect users/callers to clinic staff. |
| **Post Treatment Care** | |
| Treatment Monitoring | Applications platform for web and IVR presentations/interactions. Communications platform to connect users/callers to clinic staff. |
| Field Visits/Home Care | Applications platform for presenting information to mobile devices (may include cellular or Wi-Fi PCs, Smart Phones or Tablets). Communications platform to support field needs (IM, presence, calls). Video and real-time data options for remote caregiver interactions. |
| **Hospital/Clinic Mgt.** | |
| Administration | Standard UC Solutions, integrated to Office and workspaces (SharePoint). Communications platform for desktop and mobile communications. (IM, Presence, calls, conferencing via voice/web/video). |
| Facilities | Standard UC Solutions, integrated to Office and workspaces (SharePoint). Communications platform for desktop and mobile communications. Optionally, Applications platform for facilities database access. |

| UC Solution | Microsoft Lync Capabilities |
|---|---|
| Fund-Raising, Marketing, PR <br><br> Funding | Standard UC Solutions, integrated to Office and workspaces (SharePoint). Communications platform for desktop and mobile communications. Optionally, Applications platform for campaigns and database access. |
| Research <br><br> Research | Standard UC Solutions, integrated to Office and workspaces (SharePoint). Communications platform for desktop and mobile communications. (IM, Presence, calls, persistent chat, conferencing via voice/web/video). |

For Healthcare organizations that prefer cloud-based services, such as are increasingly being deployed for EMR, Practice Management, and Hospital Information Systems (e.g. Epic, Cerner, Siemens, Allscripts, et al.), Microsoft Lync will be available in 2011 on a secure, enterprise-specific, user-based subscription via Microsoft Office 365.

This evaluation of Microsoft Lync for UC Healthcare solutions is based on the requirements shown above.  This also reflects the ranking of Microsoft UC products as the industry-wide leader in the 2010 Gartner Magic Quadrant[2].

## UC Benefits in Healthcare

The benefits of UC in Healthcare are very clear and compelling.   Specific Since Healthcare comprises many communication-intensive processes, the benefits of Unified Communications can have significant positive impact in almost every area.  Examples were presented in each process area, above.  To recap, the major benefits appear as improvements in:

- ■ Throughput, Occupancy and Utilization
- ■ Quality of Care
- ■ Cost and Reimbursements
- ■ Operational Efficiency
- ■ Regulatory Compliance

Certainly, there are many estimates available of the scope of these benefits, yet each Healthcare organization has unique attributes, so the recommended approach is to review your organization to find and to quantify the benefits that are most applicable.  Those opportunities can then be prioritized to match the organization strategies.

## Summary

Healthcare is a communications-intensive industry.  Unified Communications (UC) represents a set of technologies and methods with the potential for dramatic improvements in Healthcare processes by mitigating or removing the well-known obstacles in the current communications approaches and tools. This paper has identified over a dozen major areas for improvement, described the solutions to realize

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[2] Magic Quadrant for Unified Communications, July 2010

those improvements, highlighted the benefits of those solutions, and defined the technology requirements for each of those solutions.

Healthcare organizations would be well-served to create a UC Roadmap as suggested in this white paper so as to properly inform their communications and IT strategy and so as to maintain the organization's ability to deliver competitively high quality care while controlling Healthcare costs.