A Framework for Unified Communication and Collaboration
Strategy for telcos

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Submitted to the System Design and Management Program
In Partial Fulfillment of the Requirements for the Degree of

Master of Science in Engineering and Management

At the

Massachusetts Institute of Technology
February 2008

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Abstract

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Submitted to the System Design and Management Program on Jan. 30, 2008 in Partial Fulfillment of the Requirements for the Degree of Master of Science in Engineering and Management

Unified Communication and Collaboration (UCC) is a product offer that is the result of fixed and mobile networks convergence and the possibility of development of applications which are interoperable. Currently there are stand-alone products such as VoIP, VPN, Contact Center, Conferencing, Security Services, Email, IM, Presence and others which operate in silos and have complicated and difficult interoperability. In addition, applications are difficult to develop on top of this disparate infrastructure. The convergence of all communication networks on Internet Protocol (IP) and the emergence of more open software platforms have enabled a new paradigm – UCC – to emerge that will change how people communicate and collaborate.

The purpose of this paper to analyze the impact of changing communication needs on vendors in general, with a specific emphasis on incumbent telecommunication carriers – network operators and service providers – so-called “telcos”. It further illustrates a framework through which an incumbent telco can clearly identify an appropriate strategy for Unified Communication and Collaboration which utilizes its legacy strengths while moving towards innovation.

In this paper, an analysis of publicly available data from research companies is performed; Unified Communication and Collaboration is fully defined; market drivers in large enterprise (often known as just Enterprise), and in small and medium business (also called SMB) are analyzed; competitive analysis of Unified Communication and Collaboration equipment vendors and carriers is illustrated; and an appropriate architecture for UCC is outlined. Special focus is given to incumbent telco’s role, in comparison to equipment vendors, in the emerging Internet Protocol (IP) based communication technologies which are undergoing active diffusion. The result shows that carriers have more opportunity to capture value through hosted UCC in small and medium business (SMB) market as compared to large Enterprise. Existing hardware communication vendors are better positioned to get the major share of large Enterprise through software based customer premises equipment (CPE) UCC but carriers have an opportunity to provide software as a service (SAAS) services and to exploit their existing distribution channels.

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Michael Allan Martin Davies
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Acknowledgements

I am indebted to several teachers, friends and family for providing me support, encouragement and guidance during last few years.

I would like to thank my thesis supervisor Mr. Michael Davies for providing guidance on my thesis. He is a wonderful person to know and very knowledgeable on Technology Strategy and Telecommunications Industry.

I have learnt a lot from my teachers at MIT. They were simply invaluable and I feel like a different person from when I started at MIT and it is primarily due to their invaluable knowledge in diverse areas that they were able to impart successfully. I would like to thank Michael Cusumano, Ralph Katz, Dan Whitney, Ed Crawley, Nancy Leveson, Howard Anderson, Duncan Simester and Anthony Marciano. I would like to specially thank Director SDM Program Pat Hale who has been so supportive, kind and helpful during the program.

I would like to thank my SDM class fellows and Sloan friends for providing their valuable insights and comments. It helped diversify the knowledge and made the learning experience extremely rich. I would like specially thank Zia Hydari for his continuous support and encouragement in general and collaboration in writing this thesis in particular.

Finally I would like to thank my wife Zari for her unconditional and loyal support during extremely busy days of job and study together. I loved to play with my daughter Seimoon and I was lucky to have an addition of my son Hamdan to our family during the degree. I hope that I can give my family more time in the future and support them as they did during my program.
Table of Contents

Abstract......................................................................................................................... 2
Acknowledgements........................................................................................................ 3
Table of Contents........................................................................................................ 4
List of Figures .............................................................................................................. 5
List of Tables ............................................................................................................... 5
Chapter 1 - Introduction .............................................................................................. 6
  1.1 Background ........................................................................................................ 6
  1.2 Defining Unified Communication and Collaboration ......................................... 8
Chapter 2 - Customer Analysis .................................................................................. 11
  2.1 Market drivers ................................................................................................... 11
  2.2 Innovation and Diffusion ................................................................................. 13
  2.3 Customer Preferences ..................................................................................... 17
Chapter 3 - UCC Market Analysis .......................................................................... 21
  3.1 UCC Major Components ................................................................................ 21
  3.2 Market opportunity .......................................................................................... 22
  3.3 Wireless Carriers assets for UCC .................................................................... 29
Chapter 4 – Competitive Analysis .......................................................................... 31
  4.1 Major Equipment Vendors ............................................................................ 31
  4.2 Market positioning of Vendors ....................................................................... 35
  4.3 SWOT Analysis for an Incumbent Telco ......................................................... 37
  4.4 Vendors and Carriers Competitive Analysis .................................................. 38
  4.5 Competitive Analysis Summary ..................................................................... 40
Chapter 5 – Carrier UCC Strategy ......................................................................... 41
  5.1 A Framework for UCC Analysis ..................................................................... 41
  5.2 Strategy Options for Incumbent Telco ............................................................. 45
  5.3 SMB Needs ..................................................................................................... 46
  5.4 IBM & Carrier Partnership Structure .............................................................. 47
  5.5 Capitalizing on SaaS........................................................................................ 52
  5.6 Partner Solution Advantages to SMB ............................................................. 52
  5.7 Partnership Value to IBM & Carriers .............................................................. 54
Chapter 6 - Conclusion ......................................................................................... 55
  6.1 Summary ......................................................................................................... 55
  6.2 Additional Research ....................................................................................... 55
Bibliography ............................................................................................................... 56
Appendix A: Original Thesis Proposal ..................................................................... 58
Appendix B: Market Sizing ....................................................................................... 60
Appendix C: Customer Adoption .............................................................................. 63
Appendix D: Customer Preferences .......................................................................... 66
Appendix E: IBM ...................................................................................................... 70
Appendix F: Cisco .................................................................................................... 74
List of Figures

Figure 1 - UCC Evolution to Integrated Communication ........................................... 9
Figure 2 - Sales Penetration ................................................................................. 13
Figure 3 - Market Timing ..................................................................................... 14
Figure 4 - UCC: Long haul smash hit ................................................................. 17
Figure 5 - Customer survey on UCC .................................................................... 19
Figure 6 - A Framework for UCC .......................................................................... 22
Figure 7 - US IT Spending Summary ..................................................................... 23
Figure 8 - SMB Hosted Telephony market detail ................................................... 26
Figure 9 - UCC Evolution from Standalone Services to Converged Solutions ..... 41
Figure 10 - Carrier UCC Participation Options ...................................................... 45
Figure 11 - Products offered to SMB ...................................................................... 46
Figure 12 - Carrier & IBM combined offer ............................................................. 48
Figure 13 - IBM & Carrier Combined Offer Responsibilities .................................. 49

List of Tables

Table 1 - Vendor Preference Survey ....................................................................... 19
Table 2 - US Statistics of Firms, Employees and RAM ............................................. 23
Table 3 - On-premise Enterprise Telephony market ................................................ 25
Table 4 - Hosted telephony market ........................................................................ 26
Table 5 - Cellular Wireless Market ........................................................................ 27
Table 6 - State of Enterprise IM market ................................................................ 28
Table 7 - State of Corporate Email market .............................................................. 28
Table 8 - UCC positioning of major equipment vendors ....................................... 36
Table 9 - Microsoft vs. Carriers Competitive Analysis ........................................... 38
Table 10 - IBM vs. Carriers Competitive Analysis .................................................... 39
Table 11 - A framework for identifying UCC priority .............................................. 43
Table 12 - IBM and Carrier Existing SMB assets ................................................... 48
Table 13 - IBM & Carrier Combined Offers ............................................................. 50
Table 14 - Competitor SMB Product Offerings ..................................................... 51
Chapter 1 - Introduction

1.1 Background

In our recent past, the two main modes of communication were Telegraph and Telephone. These allowed simple and quick data and voice communication, respectively. Telephony used to be through manual switches which later changed to analog switches before transforming to fixed-line digital telecommunication and wireless networks. Similarly, telegraph data transfer was also transformed to computer networks data communication. The emergence and growth of the Internet revolutionized communications in the 1990s and made the convergence of data and voice possible for end users. It changed the way users communicate, but also created many new options for communications, such as e-mail and instant messaging (IM) which not only complicated life for individual users but exponentially increased communication complexity for businesses.

Last two decades created tremendous opportunity and growth as large businesses spent tremendous resources on supply chain management and system integration. Companies streamlined their organizations by making them cost effective, globalizing through outsourcing and off-shoring, customizing, and standardizing through workflow. Supply chains have been so optimized that everyone in the chain can electronically check status, order, ship, and invoice in real time, as business processes and workflows are integrated with back-end databases and systems. In today's knowledge-based businesses, the value chain spans organizational, cultural and national borders. For example, hospitals and clinics based in the U.S. use specialists in Australia and India to read X-rays and MRIs; law firms use Indian and Filipino attorneys to perform legal research and to prepare briefs; a significant number of U.S. tax returns are actually being prepared by accountants in India; call and order processing centers are springing up in India, Costa Rica, the Philippines, Argentina, and Mexico [32].

With the optimization of global supply chain for services, it has also become more complex. The need to communicate and collaborate between individuals and groups of individuals has grown exponentially as suppliers, IT, manufacturing, R&D, engineering, production, operations, sales,
marketing, finance, and retail have all become globally dispersed. All type of companies are acknowledging the competitive need to streamline the flow of knowledge and information worker expertise within the business regardless of where in the world that knowledge and expertise need be applied. The workers need to check emails inside and outside the network through personal computer (PC) or Blackberry, communicate on IM, one cell phone for home and one for business, one fixed-line phone for home and one for office. Some need to work from home, some from office and some on the go. Users want to be able communicate through different communication tools in an efficient, seamless and cost-effective way.

Due to increased complexity, there is a growing user need to have a uniform communication method through which all the complex real time communication needs are met. Unified Communication and Collaboration (UCC) is the result of convergence of fixed and mobile networks and the possibility of development of applications which are interoperable. Currently there are products such as VoIP (Voice over IP), VPN (Virtual Private Network), Contact Center, Conferencing, Security Services, Email, IM, Presence and so on which operate in vertical silos and have very complicated interoperability. Applications are difficult to develop which utilize common resources and therefore enable all the above products and services to interoperate seamlessly. The convergence of all communication networks on Internet Protocol and on more open software platforms has enabled this new paradigm of UCC to emerge that will change how people communicate and operate businesses with maximum productivity of workers.

Different equipment vendors have taken up this challenge and have come up with interesting products which compete directly with incumbent telecommunication companies’ – carriers’ – legacy products. Both will be used interchangeably in the rest of the paper. There is a pressure on carriers to develop an effective technology strategy to ensure that they survive and thrive. The purpose of this paper is to discuss the impact of UCC from an incumbent telco’s perspective and to explore the technology strategy options through a framework for UCC analysis.

For clarity purposes, it will be useful to define a few keywords before diving deeply into UCC.

**Businesses:** It is used to describe a company of any size which operates a business.

**Large Enterprise:** It is used for a company with more than 1000 workers
**Medium Business:** It is used for a company from 100 to 999 workers

**Small Business:** It is used for a company from 5-99 works

**SOHO:** It is used for a company with less than 4 workers

**SMB:** It is used for the small and medium businesses including SOHO which means it can have 2 to 999 workers.

**Equipment vendors:** It includes all hardware and software vendors of CPE based equipment and UCC.

**Telco:** It is used for an incumbent telecommunication company which is also sometimes known as a Carrier.

Major research questions in this thesis are:

- What is Unified Communication and Collaboration (UCC)?
- Who are the customers and what do they think about UCC?
- What is the innovation in UCC and how it will diffuse?
- What is the UCC market opportunity in large enterprise and in small and medium businesses and how can the target market be segmented for prioritization by incumbent carriers?
- What is the significance of UCC to equipment vendors and to incumbent carriers?
- How do equipment vendors compete with each other and with the incumbent telcos as UCC a software rather than a hardware play?
- Why a framework for UCC is needed to analyze future technology strategy utilizing existing assets?
- As a result, how can different UCC options for incumbent telcos be analyzed for devising a short term and long term strategy?

### 1.2 Defining Unified Communication and Collaboration

Unified Communication and Collaboration (UCC) is defined as a software infrastructure platform that consolidates directory, routing, and management of communications for a growing set of applications including: advanced IP telephony calling and management; web, audio- and videoconferencing; instant messaging; and pervasive presence awareness and management; all
accessible through desktop and mobile devices and as capabilities available to business applications developers [4]. UCC allows people to communicate and thereby collaborate using the most optimal application and readily available device. UCC links communication and collaboration applications to improve employees’ ability to reach each other more quickly and to reduce delays in business communications [6].

The major benefits of UCC are:

- **Ease of use** – Different communication channels will have interoperability and common resources behind the scene, providing end users with an easy and seamless experience as shown in the examples below.
- **Speed** – UCC will allow users to communicate more efficiently thereby reducing the time to reach other end users.
- **Rich experience** – UCC will provide the users with a very rich experience which they had wished, for example to be able to drag and drop contacts from email and start a audio, video and/or web conference.

![Figure 1 - UCC Evolution to Integrated Communication](image)

UCC will allow the users with the following basic communication needs in a unified and integrated solution (Shown in Figure 1):
• **Real Time Communication (IM, Voice)** – It includes two way communication such as chatting on Internet message, a telephone or video call and conferencing.

• **Productivity Tools** – It includes enterprise workflow and communication enabled business process tools.

• **Personal Information Management** – It includes contact and address information.

• **Unified Messaging** – It includes applications that unite email, fax, and voice messages in single mailboxes which can be accessed in real time by PC, browser, or telephone. Different message types such as voice, video, images and documents are integrated and stored in a single repository with an access layer into separate message stores in this solution. It is important to note that unified messaging is a subset of Unified Communication and Collaboration and cannot be used interchangeably.

• **Mobility** – It includes wireless devices and applications which are needed for mobile customers.

• **Presence** – It includes presence on different communication channels such as IM, Fixed Voice and Mobile Voice.

**Examples**

Some of the examples utilizing Unified Communication and Collaboration are given below:

a. Transfer call from desk phone to mobile phone to continue a conversation while en route to next destination.

b. Access shared files from desktop, laptop or mobile while on the road

c. Control communications from within the business application – chat with others who are working on the same presentation without leaving the presentation

d. Check availability, click on person and have call automatically routed to office or mobile phone based on preference set by user

e. See all email, voicemail and faxes in the same inbox. Choose to respond to an email with a call by clicking on the sender or send an email in response to a voice message.

f. Listen to email and voicemail when you call in from the road.
Chapter 2 - Customer Analysis

Within customer companies, it is important to differentiate between communication service end users and customers, typically the IT department, which is responsible for meeting the technology and communication needs of end users. UCC is bound to create significant organizational, financial and cultural challenges for customer companies. On one hand it creates business value for end users by integrating all the communication needs but on the other hand return on investments (ROI) made by IT on their behalf will need to be justified, different equipment vendors will need interoperability, there will be changed dynamics between voice, email and IM, legacy infrastructure will need to be replaced according to a strategic plan, and personnel will need to be trained by IT. This might force IT organizations to look for less quantifiable methods of justifying UCC investments than simple cost savings, for example quicker information access, better resources for planning process, instant issue resolution and expedited process cycles.

2.1 Market drivers

The following are major market drivers for UCC:

Convergence of legacy and new services on IP

The definition of IP communications is broadening to include new services such as presence and integrated messaging that improve end user productivity, as well as improved desktop access to communication and collaboration applications. This expands the business benefits of UCC, helping IT managers to build and justify the case for IT investments within their organization and to determine quantifiable savings in areas, such as increased operational efficiency, reduced travel costs, improved employee productivity, and better use of existing applications [6].
**Increasingly Mobile Workforce**

The workforce is becoming increasingly mobile and their requirements have grown in terms of interoffice and remote connectivity. They need to connect through phone, wire line and wireless, and laptop to access information, use tools and communicate with their co workers from hotels, cars and client offices.

**Strong purchasing control and management**

IT managers are tasked with improving the management of multiple independent communications devices used by workers. Having multiple networks and services providers drives up support costs for managing numerous devices and applications requiring IT managers to take new measures to standardize these purchases. Increasingly complex applications and integration requirements cause IT managers to look for ways to reduce the complexity of managing their IP platforms. Moderate growth in IT spending mandates IT managers control budgets without sacrificing services [6].

**Ease of Use**

UCC will break the communication silos because of common infrastructure and IP based network. The inability to reach other employees at important times results in numerous delays and lost productivity. The workforce needs to focus on its job instead of complex management of multiple communication devices and tools. Companies cannot afford to waste worker’s time with non-productive activities. For example, employees spending time in an attempt to reach others for critical decisions is one area that results in lost productivity and more cost to company. Similarly they want to be able to save contact once and use it across all applications and devices such as outlook, cell phone and work flow engine.

The users will not need to worry about multiple communication channels. For example, a user can check email on the email client, see the status of sender whether he’s busy on his cell phone or office phone and make a phone call right from the email client and start a web conference.
2.2 Innovation and Diffusion

According to Everett Roger's model of 'Diffusion of Innovations' and the forecasts by Frost & Sullivan, Large Enterprise users are the 'Early Adopters and Majority' while SMB will be 'Late Majority'. Adoption will be higher in the large Enterprise space for the next four years. Large Enterprise sales are forecasted to be 35M seats in 2007-2011. Forecasted growth rate is picking up in 2008 as Unified Communication and Collaboration becomes main stream in large Enterprises.

![Number of New Seats/Yr by Segment](image1)

*Source: Frost & Sullivan*

**Figure 2 - Sales Penetration**

The market timing is important in business UCC solutions. Large Enterprise is asking for UCC solutions today and is expected to be highly penetrated into during 2008 and by 2009. Medium business lags Large Enterprise by 1 year, Small business by almost 3 and very small business by 4. By 2011, very few new Large Enterprise seats will be available for capture while the majority of available seats will come from medium, small and very small business users. This is shown in the figure 3.
Switching Cost

In large businesses, switching costs are very high. Each communication solution costs millions of dollars in hardware, software and maintenance. The buying decisions are critical, long term and can be influenced when completely new solutions are bought or existing hardware and software is being renewed. Timing of these decisions often results in Domino effect; Email decision dictates IM decision which dictates UCC Client decision which dictates collaboration decision, all of which impact IPT decision (which is often the first decision…). Most of the existing large enterprise customers had invested heavily in TDM based telephony solutions during 90s and their equipment is ready to be upgraded for IP Telephony through IP PBX. This heavily influences their future decisions for UCC since voice is an important component but their switching cost is not particularly high because they anyway want to get rid of TDM based voice equipment with the latest IP Telephony solutions. In comparison, if they have already made investment in email or IM, the switching cost is very high because both solutions are software based and usually tightly integrated with employee directory and business processes. For example, if a business has Microsoft exchange server already installed for email needs, it requires a major effort to replace with IBM Lotus notes and train support staff and users. Therefore UCC decision will be guided by existing infrastructure if it’s already in place. New large enterprises are relatively free to choose the best UCC solution offered. SMB needs are largely different from large enterprise and its communication requirements change as they grow. For example, they might not require a dedicated exchange server for email when small business but as they grow to become medium business, they need it. Similarly they can use commercially
available AOL or Yahoo IM initially but as they grow and their security and tracking requirements change, they might opt for Sametime from IBM. UCC vendors can get them as they buy.

**Relative advantage to end users is more as compared to customers**

Since UCC is the integration of different communication mediums, it has a strong technology and user experience advantage over the existing communication solutions which are stove piped. It allows usage of common resources, cost reduction and interoperability which were not possible in a seamless way earlier for IT customers. The communication experience will be simple to end users with easy to use UCC clients integrating their existing communication channels while pushing the complexity to equipment and software vendors and IT.

**Compatibility with existing resources is high**

UCC enriches the user experience with ease of communication on products they are already used to. For example, if they are used to Microsoft email, they can still keep using it but in addition they will be able to make voice calls directly from the contracts list or the email they received. Similarly they can start an IM conversation while on the email client. They can drag multiple contacts and start a web conference.

**Complexity of use and operation**

UCC stems from the strong desire of business customers to simplify communication and therefore it will make it very simple to use from the end user’s perspective. But for system integrators the design and implementation complexity will increase due to integration of numerous communication components with interoperability of different equipment vendors and networks.
**Trialability is incremental for large enterprise**

Trialability is one of the biggest concerns for business customers, especially for large Enterprise. A limited successful trial of a UCC does not translate directly into a solution which can replace existing legacy solutions already in place. It will be a gradual replacement process which can take multiple years. SMB does not have the resources to deploy large communication solutions while being small and as its needs grow, successful UCC trial can mean a successful solution with incremental changes under the assumption that it chooses to stay with the same UCC vendor. If it tries to change UCC vendor or uses multiple vendors, it can run into challenges. New companies will have a distinct advantage of choosing a single vendor who can satisfy all their needs.

**Observability is low**

Customer perceptions and the observability also play an important role in their decisions. In one of the surveys performed by Forrester [9], they found that there is a lot of confusion about UCC despite high level of interest. A lot of customers think that IP telephony is Unified Communication and Collaboration and they do not include other components such as email or IM in the UCC solutions.

Many also believe that only a small minority will get real value of UCC solution when integrated with business systems. Only technical users understand the tight integration of business applications and personal information with communication infrastructure. Another misconception is that UCC is a point solution around IM, IP telephony or email. This means that benefit of UCC are not easily observable which could hamper its adoption.
2.3 Customer Preferences

Looking at UCC in John Gourville’s ‘Eager Seller and Stony Buyers’ Model, it is easy to see in the highlighted area that UCC will be a smash hit both in large Enterprise and SMB (Shown in figure 4). It will again be easier to understand if we divide the enterprise customers into end-user and IT (Organization responsible for buying decision and implementing UCC). It will be a long haul for IT department as they implement UCC solutions. There will be a major change in their behavior while the long term payoff is high. As the UCC solution becomes available to end-users within the business, it has the potential to become a smash hit.

![UCC Diagram](image)


Figure 4 - UCC: Long haul smash hit

To understand why customers will want to have UCC solutions, surveys performed by different research companies were further analyzed. (Table 1, Appendix D, [7, 8]). These indicate that customers will not rip and replace existing investments with new UCC solutions due to compatibility reasons making it a long haul for IT departments Customers IT department base their UCC decision on existing investments, especially in large enterprises, a key investment is voice that is the conventional PBX used for office phones.
Existing voice investments will likely be most important driver of UCC decisions because of the following reasons:

- Voice is lifeline for many businesses
- Long term service and maintenance contracts
- Equipment amortize over several years

This means that UCC vendors with existing customer penetration in voice and established trust are very well positioned to offer next generation IP Telephony e.g. Cisco. Traditional TDM PBX providers are at disadvantage because of their equipment at end of life for most of the large enterprise while SMB usually does not employ it due to its low cost voice solutions preference from telcos. Some wholesale vendors such Yahoo, MSN, Google and AOL are also offering free or cost effective internet telephony with low quality to very small to small SMB segment but no switching cost is involved if better SMB customized UCC solution is provided.

Existing email investment is likely to be the second most important driver for the following reasons:

- Custom applications such as with Notes create stickiness
- Email migration is a costly process (estimated at $200 per seat)

Existing IM investment is likely to be the third important factor (Secure IM does not have high penetration)

- Sold on per seat yearly license ($55 list for Sametime offered by IBM)
- Federation is less important in large Enterprises as Corporate IM replaces public IM usage
- Corporate directory helps rebuild contact list
Customers were surveyed by Forrester about their UCC preferences. One third customers think that Unified Communication and Collaboration is critical to knowledge worker productivity. One third of Large Enterprise decision makers say that implementing UCC a priority in 2007. Customers have a range of different needs. Some features matter less as compared to others. Customer’s adoption is driven by cost and benefits. Dissatisfaction with existing technologies is not high for all customers. UCC awareness is also not an issue. Adoption will be over several years as usage best practices emerge and show results. It further shows that it’s a long haul for IT departments.

<table>
<thead>
<tr>
<th>Features And Benefits That Matter</th>
<th>Reasons Not To Deploy Unified Communications</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of respondents</td>
<td>% of respondents</td>
</tr>
<tr>
<td>Integration of voice mail and e-mail</td>
<td>Difficult to measure or prove ROI</td>
</tr>
<tr>
<td></td>
<td>Upgrade costs</td>
</tr>
<tr>
<td></td>
<td>Employees won't embrace the technology</td>
</tr>
<tr>
<td></td>
<td>because alternatives exist</td>
</tr>
<tr>
<td></td>
<td>Immature technology or market</td>
</tr>
<tr>
<td></td>
<td>It's unreliable</td>
</tr>
<tr>
<td></td>
<td>Interoperability issues</td>
</tr>
<tr>
<td></td>
<td>Security concerns</td>
</tr>
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<td></td>
<td>% of respondents, 225 business technology</td>
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<td>professionals</td>
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<td>% of respondents, 225 business technology</td>
</tr>
<tr>
<td></td>
<td>professionals</td>
</tr>
</tbody>
</table>

Source: Information Week and Forrester research

Figure 5 - Customer survey on UCC
As shown in figure 5, the two main reasons for not deploying UCC at this point by customers IT department, the organization responsible for buying decision and implementing UCC, is that it is difficult to measure ROI and upgrade costs are high but this will change in next three to five years as shown in the market analysis shown in the next chapter.
Chapter 3 - UCC Market Analysis

Large Enterprise customers are asking for UCC solutions now. They have chosen their ‘horse’ for desktop, application and voice (fixed-line and mobile) providers but need to pull them together for UCC. They also feel they have components and can do many UCC functions today, and that they don’t need completely new ‘integrated’ solution.

SMB customers are starting to show interest (less than 2% penetrated in 2007) but look for business solutions, not just enabling technology.

The UCC provider space is highly fragmented because of individual components; some players have started to integrate solutions such as Microsoft email with voice through OCS (Office Communication Server), Cisco voice with web conferencing with acquisition of WebEx.

3.1 UCC Major Components

Figure 6 shows a clear view of today’s converged products and services which are important from UCC perspective. Email, IP Telephony, Mobile voice and IM are highlighted in figure 6 below because these are the areas in which customers have made major investments, are extensively used and are important vehicles for enabling UCC. For example, if the customer is planning to purchase or already purchased on-premise IP PBX for its voice communication needs, they would need to make sure that other products such as conferencing or PIM are compatible with it. Similarly, if they have already one email solution, they want the presence and other business processes to work with it. Customer’s presence, PIM or conferencing solution will not guide their investments for email, voice (mobile and IPT) and IM. That’s why primary and first order products i.e. email; IM and voice have been discussed in detail in this paper.
3.2 Market opportunity

Large Enterprise and SMB market is segmented by communication products and there is significant opportunity for UCC equipment vendors and Carriers. In large enterprise, Voice is provided by different traditional equipment vendors like Nortel, Avaya, and Cisco etc. by using telecommunication networks. Email solutions are mainly provided by Microsoft and IBM. Similarly IM is largely provided by Microsoft, IBM and a number of other companies Email solution may be provided by one vendor while the telephony may be provided by another. In SMB, customers try to use cost effective and different traditional solutions like traditional hosted telephony service from telcos directly for voice and hosted solution email and IM from Microsoft, AOL, and IBM through value added resellers (VARs).

As compared to large Enterprise, SMB employs more workers and is an attractive market opportunity for UCC providers if a light weight and affordable solution can be customized. Some observations from the Table 2 are given below:

- 80 million or 59% of US workforce employed by SMBs (Small, Medium and SOHO)
- 55 million or 69% of SMB workforce is RAM (Remote and Mobile Worker)
- Small business expected employee growth exceeds other segments
- RAM workers are expected to grow faster within small business segment
Business services and public sector verticals have largest IT spending within SMB as shown in figure 7 making them the priority targets.

SMB is an immature, untapped and large market for UCC. If UCC provider focuses on it now, it has a better opportunity to take major share of this market segment. Some more facts are given below which further the SMB attractiveness hypothesis:

- IP PBX penetration (key component of UCC solution) hitting stride
  - 53% of SMBs, 68% of Large Enterprise will have implemented IP Telephony (IPT) in 2007
• Increasing need to support Remote and Mobile (RAM) workforce pushing demand for UCC and Fixed Mobile Convergence (FMC)
  • 45% of all US employees (62M in 2007 growing to 65M by 2010) work outside of main office (In-Stat)
  • 56M SOHO/SMB and 47M Large Enterprise employees are considered Remote and Mobile (RAM)
    – Frequent biz travel, mobile office, multi site, remote branch, telecommuters, non-office workers

**Voice**

As discussed earlier, voice is the most important component of UCC because of its high cost and importance to end users in running day to day business. Voice solutions can be divided into three broad categories.

1. **Fixed-On-premise**: PBX installed on customer premise along with phones.
2. **Fixed-Hosted**: Only phones are on customer equipment and call management is provided by PBX installed in Carrier's data centers.
3. **Wireless**: Cellular phones are used by customers to connect to wireless network provided by Carriers.

**On-premise Enterprise Telephony**

Cisco is the emerging leader in enterprise telephony; hosted telephony lags on-premise telephony. Some observations about on premise solutions are given below:

• Large enterprises prefer on-premise solutions
  – Only 27% of large Enterprises have deployed carrier provided VoIP service (In-Stat)

• Many enterprises have invested in new hardware before Y2K
  – Hardware is now being updated with new IP based hardware

• Avaya has launched IP Telephony on Demand which allows subscription payment rather than capital expenditure (capex)
It creates parity with the operating expenditure (opex) argument in favor of hosted telephony solutions provided by telcos

- Microsoft entered enterprise telephony in 2007
  - Product is likely to take years to mature

- Traditional PBX that used circuit switched networks also called TDM PBX will be almost completely replaced by IP PBX that uses packet switched network (IP Network) through 2011

<table>
<thead>
<tr>
<th></th>
<th>Total PBX</th>
<th>IP CM</th>
<th>IP Phones</th>
<th>Hybrid TDM/IP</th>
<th>Gateway</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avaya</td>
<td>19%</td>
<td>-</td>
<td>23%</td>
<td>40%</td>
<td>2%</td>
</tr>
<tr>
<td>Cisco</td>
<td>16%</td>
<td>52%</td>
<td>38%</td>
<td>-</td>
<td>80%</td>
</tr>
<tr>
<td>Nortel</td>
<td>13%</td>
<td>15%</td>
<td>10%</td>
<td>17%</td>
<td>1%</td>
</tr>
<tr>
<td>Other</td>
<td>52%</td>
<td>33%</td>
<td>29%</td>
<td>43%</td>
<td>17%</td>
</tr>
</tbody>
</table>

Table 3 - On-premise Enterprise Telephony market

Hosted Telephony

In hosted telephony, servers and services are hosted by incumbent telcos. Hosted telephony is important for SMB since they need cost effective telephony solutions which do not require high initial capital investment in PBX and recurring maintenance cost. This market segment is expected to grow to ~$4 billion by 2011 from which telcos and hosted telephony providers can capture maximum value by bundling it with a UCC solution. Some more observations about hosted telephony market are given below:

- Hosted IP market is expected to grow to ~$4B by 2011 and was only $144M in 2005.
- Hosted IP revenue forecast is based on line growth from 263 K in 2005 to 7 M in 2011
- Small businesses provide a much larger percentage of hosted voice revenues
  - In 2005, revenue split between large/medium/small was 13%/35%/52%
- Covad, AccessLine and NGT lead the hosted telephony market with 15%, 11%, 11% unit shipment market shares (2005) (figure 8)
Table 4 - Hosted telephony market

- Highly fragmented market dominated by small service providers
- Small businesses provide larger percentage of hosted voice revenues
- Number of sites and users per site increasing
- Government and Education HIPC adoption expected to continue to increase

<table>
<thead>
<tr>
<th></th>
<th>2005 (LM)</th>
<th>2011 (LM)</th>
<th>CAGR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hosted IP</td>
<td>144</td>
<td>4,019</td>
<td>47%</td>
</tr>
<tr>
<td>VoIP Access/Trunking</td>
<td>228</td>
<td>7,608</td>
<td>58%</td>
</tr>
<tr>
<td>Enterprise Telephony</td>
<td>2,950</td>
<td>4,680</td>
<td>8%</td>
</tr>
<tr>
<td>IP PBX</td>
<td>1,440</td>
<td>2,060</td>
<td>7%</td>
</tr>
<tr>
<td>Pure TDM PBX</td>
<td>833</td>
<td>6</td>
<td>-61%</td>
</tr>
</tbody>
</table>

* Enterprise Telephony includes TDM PBX lines, KTS lines, TDM-based phones shipped in conjunction with pure TDM systems, IP-enabled lines, IP PBX/Converged lines, Pure IP lines and IP phones
* Source: Frost & Sullivan

Figure 8 - SMB Hosted Telephony market detail

**Cellular wireless**

The market is dominated by mainly four carriers. Some key observations about wireless market are given below:

- Verizon Wireless leads the market by revenue and churn while AT&T leads by subscribers.
- Both AT&T and Verizon are also leaders in wire line.
- Verizon Wireless and AT&T Wireless lead the market with strong outlook
  - Verizon Wireless also leads on Q2 2007 revenue
- AT&T gained subscribers due to iPhone but growth is slowing for that factor alone
- Sprint-Nextel may be takeover targets due to lack of clear strategy in wireless but can still play an important role in UCC due to large subscriber base
- T-Mobile is supported by its international parent Deutsche Telecom
- Large Enterprises do not provide cell phones to all employees
  - Multiple carriers coexist within large Enterprises based on personal choices of cell phone owners

Telcos such as AT&T and Verizon, who have wire line and wireless, with large wireless voice customer base are uniquely positioned to use its customer penetration for UCC solutions e.g. single business voicemail with office voicemails and cellular voicemails in a single box and unified visual experience to listen to them.

<table>
<thead>
<tr>
<th>Leading US Wireless Carriers</th>
</tr>
</thead>
<tbody>
<tr>
<td>(First quarter of 2007, ranked by actual revenue)</td>
</tr>
<tr>
<td>(In millions, except Churn and ARPU)</td>
</tr>
<tr>
<td>Carrier</td>
</tr>
<tr>
<td>---------</td>
</tr>
<tr>
<td>Verizon Wireless</td>
</tr>
<tr>
<td>AT&amp;T Wireless</td>
</tr>
<tr>
<td>Sprint-Nextel</td>
</tr>
<tr>
<td>T-Mobile</td>
</tr>
</tbody>
</table>

Table 5 - Cellular Wireless Market

**Enterprise Instant Messaging (IM)**

Frost & Sullivan estimated that 80% of business IM users were using consumer IM clients (2006) such as Yahoo, MSN, Google and AOL. Gartner predicts that all employees with corporate emails will also have enterprise IM by the end of this decade. Companies are willing to pay for Enterprise IM for communication security and regulatory compliance. This shows clearly that the game has just begun for IM. In 2005, Microsoft had 42% market share as compared to IBM which had 35%. With almost equal share, both companies are well positioned to capture major share of the growth. IM is considered to be one of the most critical components of UCC since it can be used as the launching pad for all the real time communication needs such as
chatting, starting a telephone call, and finding out the presence status and so on. It is widely believed that whoever controls IM controls the UCC user experience.

<table>
<thead>
<tr>
<th>Enterprise IM Seats Shipped Share</th>
<th>MSFT</th>
<th>IBM</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>42%</td>
<td>35%</td>
<td>23%</td>
</tr>
</tbody>
</table>

*Source Frost & Sullivan: F430
Table 6 - State of Enterprise IM market

Corporate Email

Corporate email solutions grew by more than 10% over 2003-2005 with 2005 revenue of $2.5 billion. Corporate email is nearing maturity with estimated installed base of 133 M seats in North America (Frost & Sullivan). Vendors are gaining customers through migration rather than finding greenfield (new) customers.

<table>
<thead>
<tr>
<th>Revenue Includes license, maintenance and technical support for Email and calendaring (Gartner)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003 Revenue (M)</td>
</tr>
<tr>
<td>-------------------</td>
</tr>
<tr>
<td>Microsoft</td>
</tr>
<tr>
<td>IBM</td>
</tr>
<tr>
<td>Other</td>
</tr>
<tr>
<td>TOTAL</td>
</tr>
</tbody>
</table>

Table 7 - State of Corporate Email market

Microsoft leads the Email and IM markets and its lead is growing but IBM has responded to Microsoft share grabbing tactics by matching Microsoft pricing ($20 rebate to move customer) along with enhancing and integrating collaboration products. Gartner’s predictions are based on inquiries and informal conversations with 150 large Enterprises during Apr 2005 to Mar 2006. 77 of these organizations asked about a move from Notes/Domino to Exchange. These organizations had 57k users on average. The decision to move to Exchange can be a deciding
factor for UCC vendor preference. If IBM does not respond and their email market share kept going down, it has a direct correlation with their UCC market share.

3.3 Wireless Carriers assets for UCC

After a strong growth in retail, large Enterprise is also expected to grow rapidly with UCC solutions which utilize fixed mobile convergence solutions. *Wireless carriers are very strongly positioned to take advantage of UCC and offer a compelling product.* Some of their assets are given below:

**Mobile Voice – Fixed Mobile Convergence**

It includes features like single business phone number on land line and wireless, simultaneous ringing on cell phone and office phone and single business voicemail.

**Presence**

Fixed-Mobile and IM presence convergence – It includes escalation of a wireless call from an IM client and web client having the capability to detect busy cell phone.

Federation with other carriers for large Enterprises – It encompasses IM capability between the subscribers of different carriers. For example, AT&T wireless subscriber can know the busy status of Verizon wireless customers when they are talking on cell phone or IM.

**Location**

Cellular and GPS location information for location based services. Only T-Mobile (amongst top 5) has opened accessed to GPS on devices.

**Contacts Synchronization**

Device address book convergence with PIM – It integrates cell phone address book with email contacts for example.
If we analyze large players and their assets, AT&T will need to co-exist with Verizon and T-Mobile in wireless market. Each of the carrier’s wireless assets, although not unique, is rare and valuable. Each of them can derive a lot of value for their assets in the UCC arena and provide an opportunity for Carriers to capture some value from equipment vendors.
Chapter 4 – Competitive Analysis

The move to UCC threatens the established status quo between incumbent voice and data equipment vendors, and presents a significant opportunity for public portal vendors (for example, Yahoo, MSN, Google and AOL) to gain fee-based traction in the corporate market. Google and other portal sites have been successful in offering services to consumers, and will attempt to drive penetration into commercial organizations with a suite of collaboration/communication/services. Incumbent Private Branch Exchanges (PBX) equipment vendors (such as Siemens, Avaya and Nortel) who have been the traditional providers of customer premise equipment for voice to enterprises, connected through Carrier networks, will struggle to remain relevant as small, medium (SMB) and large business organizations look increasingly to suppliers such as Microsoft, IBM and Cisco to deliver an integrated set of Unified Communication and Collaboration services, including voice. Voice is increasingly becoming a software play as compared to hardware. These dynamics have already created some strange bedfellows, with Microsoft closely allying with Nortel for voice expertise, and IBM aligning with Cisco for common client development activities. Organizations will be challenged to rationalize their vendor portfolios in the face of dynamic vendor activity [5]. Major equipment vendors are discussed in next section.

4.1 Major Equipment Vendors

Microsoft

Microsoft has a large and a different type of installed base to leverage compared with the traditional vendors in the UCC space. It is leveraging the successful Exchange Server e-mail, Office and Active Directory services, with the growing base of IM and Web conferencing users, to access a business population of more than 300 million users. Microsoft allows incremental enhancements to existing infrastructure which permits IT organizations to adopt UCC slowly, as opposed to the more radical re-architecting required by past and present alternatives. Microsoft's approach to Internet telephony is focused on control by endpoints rather than in a centralized telephony server. This allows it to develop a strategy that focuses on individual needs and personal controls. While the planned products are enabled through applications and servers, the
communications model overall is very user-oriented. Furthermore, Microsoft sees the cell phone and the desk phone as interchangeable, a view that is only obliquely seen by the incumbent PBX vendors. This is sure to appeal to IT development and support staff who fear the proprietary strategies offered by PBX vendors [31].

Microsoft wants to capitalize on the transition to IP telephony, premise-based audio, video and web conferencing, software based call management. Its UCC strategy is not only to target small collaborative market but large enterprise market. Microsoft plans to revolutionize the use of these capabilities by presence-enabling all of them. This strategy hits directly at the traditional alignment of vendors with communication service providers. It also permits enterprises to grow into UCC at its own pace and leverage existing infrastructure such as Exchange Server, Office and Active Directory.

Microsoft started testing its VoIP server in 2007. Its distinctive difference is that voice calls can be made from Word documents, Outlook e-mail clients or Communicator instant messaging (IM). This shows an important stage in Microsoft's evolution of corporate voice calling. Microsoft follows networking vendors, such as Avaya, Cisco, Nortel and Siemens, in delivering communications solutions capable of wide-scale integration into business processes. Its beta version has the usual limitations of first-release solutions. By 2009, it is expected that Microsoft VoIP solutions is likely to become stable enough to be reliably used in their widely deployed messaging platforms. Reliable integration of communications into enterprise platforms is a necessary precursor to the eventual development of communications-enabled business processes.

Microsoft is notorious about learning from partners and re-implementing it. It has clearly entered voice arena and plans to provide a fully integrated UCC solution in partnership with Nortel who has licensed most of its voice technology to Microsoft. This makes Microsoft a strong competitor of Carriers with limited opportunities of partnership.
Cisco

Cisco is a strong player in the IP Telephony space. For a long time, they have been achieving continuous market share growth in IP Telephony. A key forte of the company is the ability to consistently acquire new IP Telephony customers. In addition, Cisco has not only successfully retained all its existing customers but also achieved milestones in up selling to these customers. This foundation helps Cisco acquire dominance in the UCC market - a solid entry point to up sell applications. Cisco has a very well tiered channel program along with partnerships with Carriers and some of these partnerships have helped the company acquire dominance across several verticals. Cisco has also established major regional partners.

With Cisco’s history in the network space, it has the capability to provide an end-to-end UCC solution to help customers manage their infrastructure. Cisco Systems’ suite of Cisco One solutions includes switches, routers, wireless access points, security, video conferencing and surveillance solutions, all managed by the Cisco IOS software. This infrastructure is an integrated network solution that helps monitor and manage quality of service and assess overall capabilities of the network across multiple wired and wireless devices. Cisco has also introduced Unified Communicator client. As more applications in the UCC solution come into play, it will be critical to manage the interoperability between different solutions and devices that sit on the network [33].

Cisco acquired multiple companies during last few years making it a strong end to end player of UCC solution. Cisco’s recently announced acquisition of WebEx at hefty US$3.2 billion which has given it a very strong foothold in one of the key components of UCC arena and covered one of its weaknesses. Cisco ramped up its product portfolio across the conferencing and collaboration, voice and data segments by acquiring Audium – a provider of VoiceXML applications, Metreos – a provider of IP Communication applications, Telepresence – a provider of Videoconferencing, Orative – a provider of mobile applications and Linksys – a provider of wireless routers.
Cisco is a direct competitor to Carriers in IP Telephony. Earlier traditional equipment vendors such as Nortel, Avaya etc. used to provide voice over TDM PBX connected to telco network for dedicated circuits. IP PBX revolutionized communication by providing quality voice over IP Network. Cisco is one of the major customer premised based IP PBX vendor which competes with hosted telephony model in which telcos host the hardware and provide voice services. Furthermore, Cisco is uniquely positioned to provide end to end solution with strong existing penetration among enterprise customers making opportunities for partnership with Carriers limited.

IBM

IBM created one of the first premise-based unified communications systems in Lotus Sametime instant messaging client. Sametime rapidly market share, achieving more enterprise penetration than any other unified communications solution. In addition, it is major player in email solutions which also provides workflow and databases for large enterprise customers. In 2004, IBM found out that Microsoft wanted to develop a premise-based unified communications platform in Live Communications Server (LCS) that would provide same features and capabilities as the Lotus Sametime solution. Other major companies like Cisco, Nortel, Siemens, and Alcatel showed considerable interest in UCC which convinced IBM that UCC was emerging as a focal point for the future revenues for some of the largest corporations in the world and that the market was finally poised for significant growth [32].

IBM has come up with its own unified communications and collaboration strategy based on a new and open software version of IBM Lotus Sametime. IBM has long been known for creating excellent software and solutions to streamline business processes and improve enterprise effectiveness. The company has also been behind many of the innovations that have facilitated global supply chain integration and business acceleration. Now, IBM is refocusing its efforts to streamline the flow of knowledge and expertise throughout an organization using IBM Lotus Sametime and Sametime’s companion products, Notes, Quickr, Connections, WebSphere, and Domino, all based on open source Eclipse as the base. IBM has strong development resource advantages.
IBM has clearly indicated in recent announcements on the product roadmap that it will continue to support open architecture, strong ecosystem of partnerships, open integration and no intention to get into telephony business which makes it an ideal choice for Carrier’s partnership to compete with other heavy weights in UCC.

4.2 Market positioning of Vendors

Among equipment vendors, Cisco, Microsoft and IBM are fighting for UCC market leadership but there are important differences in their assets, UCC tactics and strategy. Detailed analysis is given in the Table 8.
### Table 8 - UCC positioning of major equipment vendors

Some other players like Avaya & Nortel positions have weakened with adoption of IP telephony. Google and Yahoo are not considered players in large Enterprise UCC at this point. They can
become significant players in the SMB if telcos did not act fast enough. Most of the telcos are weighing options but do not have UCC mindshare currently.

4.3 SWOT Analysis for an Incumbent Telco

Incumbent Carriers traditionally own a very important component of UCC i.e. voice and they have an opportunity to capitalize on this asset. Carriers are analyzed below in detail:

Strengths

- Communications reputation
- Wireless leadership
- Audio-conferencing leadership
- Existing Centrex base

Weaknesses

- Email and IM
- Large Enterprise Voice
- Smaller investment in technology development and marketing
- Software distribution

Threats

- Audio conferencing replacement
- Intra-enterprise networking
  - Carrier independent network build-outs
- Mobile telephony over WiFi enabled IP PBX

Opportunities

- SMB market for hosted communication e.g. Carrier can develop light weight UCC package on hosted servers.
- Establish Niche market based off hosted voice communications
- Customers are disposed toward voice solution providers
4.4 Vendors and Carriers Competitive Analysis

Now different competitive scenarios are analyzed in which email, IM and voice are provided by different equipment vendors and compare it with a Carrier to find out what opportunity and value is presented considering the amount of risk involved and who can be the likely winner. In ‘uncertain’ cases, Carriers have a chance to win by following a sound short and long term strategy.

<table>
<thead>
<tr>
<th>Email-IM</th>
<th>Voice</th>
<th>Teko Carrier Opportunity</th>
<th>Value</th>
<th>Risk</th>
<th>Likely Winner</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSFT</td>
<td>AV/NT/Other</td>
<td>Wireless presence/location wireless voice mail Audio conferencing integration</td>
<td>Fee for wireless presence Fee for wireless voice mail Increased audio conferencing usage</td>
<td>Audio conference substitution as MSFT controls interface WTP for wireless services</td>
<td>MSFT</td>
</tr>
<tr>
<td>MSFT</td>
<td>CSCO</td>
<td>Wireless presence Wireless voice mail Audio conferencing integration (if w/out CSCO MeetingPlace)</td>
<td>Fee for wireless presence Fee for wireless voice mail Increased audio usage</td>
<td>Audio conference substitution as MSFT controls interface WTP for wireless services</td>
<td>Uncertain</td>
</tr>
<tr>
<td>MSFT</td>
<td>Carrier</td>
<td>Hosted IP Voice Hosted Conferencing Converged wireless Hosted IM</td>
<td>Own majority of telecom spend</td>
<td>Predicated on migration to hosted VoIP</td>
<td>Uncertain</td>
</tr>
</tbody>
</table>

Table 9 - Microsoft vs. Carriers Competitive Analysis

As it is obvious from the table 9 that Microsoft is the most likely UCC winner when Avaya or Nortel provide voice. The winner is less clear when Cisco or Carrier provided voice.
Wireless presence/location
wireless voice mail
Audio conferencing integration
Hosted VolP

Fee for wireless presence
Fee for wireless voice mail
Increased audio conferencing usage

Audio conference substitution
WTP for wireless service

Uncertain

<table>
<thead>
<tr>
<th>IBM</th>
<th>AV/NT/Others</th>
<th>Wireless presence/location</th>
<th>Fee for wireless presence</th>
<th>Audio conferencing substitution</th>
<th>WTP for wireless service</th>
<th>Uncertain</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Wireless voice mail</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Audio conferencing integration</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hosted VolP</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IBM</th>
<th>CSCO</th>
<th>Wireless presence</th>
<th>Fee for wireless presence</th>
<th>Audio conferencing substitution</th>
<th>WTP for wireless service</th>
<th>CSCO</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Wireless voice mail</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Audio conferencing integration (if w/out CSCO MeetingPlace)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hosted VoIP</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IBM</th>
<th>Carrier</th>
<th>Hosted IP Voice</th>
<th>Own majority of telecom spend</th>
<th>Predicated on migration to hosted VoIP</th>
<th></th>
<th>Uncertain</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Hosted Conferencing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Converged wireless</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hosted IM</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 10 - IBM vs. Carriers Competitive Analysis

The table 10 shows that IBM will likely lose if Cisco provides voice but the winner is less clear when Avaya, Nortel or Carrier provided voice. There is possibility of partnership between IBM and Carrier if the voice is provided by Carrier while IM and/or email is provided by IBM. If IBM was incumbent in email, it will be difficult for customers to buy a Microsoft UCC solution. The incumbency in a part of UCC system affects the outcome of UCC preference of customers. It changes the switching and adoption behavior of customers with respect to each of these system elements.
4.5 Competitive Analysis Summary

The observations from the competitive analysis are given below for the Carriers and Vendors:

**Vendors**

- Cisco and Microsoft are the strongest UCC players
  - Winner is unclear when Cisco and Microsoft compete
- Traditional voice equipment vendors will be getting pummeled
  - Nortel gave voice to Microsoft in return for being ‘bellwether system integrator
- IBM is weaker but likely to survive as a smaller player
  - IBM’s presence in large businesses is sticky

**Carriers**

- Carriers needs to gain share of large Enterprise voice
  - Voice remains largest UCC revenue component
- Wireless and audio-conference strengths are not enough to sustain large Enterprise
  - Audio conference integration is risky
  - Willingness-to-pay for Wireless presence service unclear
- Carriers need to integrate with Email and IM components for complete solution

Cisco, IBM and Microsoft are important UCC players. The Carriers need to gain control of large Enterprise voice to be able to compete in this area and avoid being dumb pipes. Now we look at a framework which can help devise a strategy for Carriers in Chapter 5.
Chapter 5 – Carrier UCC Strategy

The issue of value capture among Vendors and Carriers is very important. In the market and competitive analysis chapters, we found that SMB is an interesting market for Carriers because of its immaturity and lack of affordable UCC solutions for small and medium business (SMB) from Vendors like Cisco, Microsoft and IBM due to their main focus on large Enterprise customers. Carriers already have high voice penetration and controls customers while software vendors control their computing needs. In this chapter, a Framework for UCC is discussed which can be used to devise a strategy for Carriers in SMB market.

5.1 A Framework for UCC Analysis

![Figure 9 - UCC Evolution from Standalone Services to Converged Solutions](image)

Figure 9 shows framework for the evolution of standalone services to converged solutions. It is divided into three high level categories:

1) Services

It includes products and services like Conferencing (Audio, Video, and Web), Voicemail, Voice telephony, IM, Email, Presence and Communication enabled business processes.
Messaging is seeing a change in terms of unification of SMS, Email and Voicemail. Similarly audio, video and web conferencing are also converging in applications e.g. WebEx allows for web conferencing but also allows to escalate it to an audio conference. UCC support applications help to aid and enrich the key services such as email, IM and voice.

2) **Network**

The network layer is evolving from silos of IP, TDM and Mobile networks to Internet Multimedia Subsystem (IMS) core on top of IP with hooks into CDMA, WIFI, TDM and MPLS networks. This presents a unique opportunity to have a converged network on top of which different software services can be built which can interoperate and have knowledge about each other.

3) **Devices and Clients**

Earlier independent devices and clients such as cell phone, VoIP SIP (Session Initiation Protocol) phone, PDA and desktop can now be integrated into UCC client who can communicate with different devices and services.

As can be seen from figure 9 that there are many components of Unified Communication and Collaboration and it is important for customers to prioritize investments considering the limited resources each company has. Gartner has created a framework given in table 11 below:
Table 11 - A framework for identifying UCC priority

In table 11, the columns indicate the relative maturity and importance of these various technologies. The rows indicate the technology areas. "Maturity" indicates the maturity of the technology when used in a standalone environment, while "UCC Maturity" indicates how effectively this solution has been integrated with broader UCC portfolios. The "UCC Priority" column indicates how critical this function is to a portfolio.

Based on this table, good UCC solutions should have voice, IM and e-mail, which are all rated as "High" in priority. Some client types also play an important role. Rich presence and mobility are also critical to any solution. Having focused on SMB, Carriers can use this table to assist in prioritizing investments and short term strategy for each of these key elements of the overall solution. They need to choose a partner who can fill the gaps in their capabilities and offerings. The importance and maturity of UCC elements determine their sequencing and prioritization.

By looking at the framework for UCC evolution and competitive analysis in Chapter 4, it can be seen that vendor’s strategy is to push Carrier’s in the network layer though traditionally Carriers have been providing a large number of integrated services from Services layer and have
controlled different devices from Device/Client layer. It can be easily observed again by looking at Table 11 and figure 6 together that voice, E-mail and IM are the key components in the Services layer for entry and success. Carriers can focus on high priority items first for the SMB market since the large enterprises already have strong penetration by equipment vendors as discussed in Chapter 4.
### 5.2 Strategy Options for Incumbent Telco

Given the UCC competitive and market situation, there are three main options for Carriers strategy. They can either build a full UCC solution or buy it from third party equipment vendors and acquire a company or partner with a company who already offers a full or part of UCC solution. Each option has its pros and cons as shown in the figure 10 below:

<table>
<thead>
<tr>
<th><strong>Build</strong></th>
<th><strong>Buy</strong></th>
<th><strong>Lease (Partner)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>- IMS Infrastructure to support IP services suite</td>
<td>- Desktop Software from ISV</td>
<td>- Build the IMS Infrastructure</td>
</tr>
<tr>
<td>- Handset Client</td>
<td>- Collaboration software</td>
<td>- Identify best of breed, market</td>
</tr>
<tr>
<td>- Desktop Software</td>
<td>- Handset Client – 3rd party developer</td>
<td>leader component providers</td>
</tr>
<tr>
<td>- Collaboration software</td>
<td>- Email software including client, IM, Presence</td>
<td>- Leverage market leading</td>
</tr>
<tr>
<td>- Email software including client, IM, Presence management</td>
<td>- IP Conferencing suite to include integrated audio and web, desktop video codecs</td>
<td>names as part of solution</td>
</tr>
<tr>
<td>- IP Conferencing suite to include integrated audio and web, desktop video codecs</td>
<td>- OEM and re-brand Carrier</td>
<td>- Integrate solution components for customized</td>
</tr>
<tr>
<td></td>
<td>- Acquire providers and create Carrier's own solution</td>
<td>implementations (Enterprise)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Pros</strong></th>
<th><strong>Cons</strong></th>
<th><strong>Pros</strong></th>
<th><strong>Cons</strong></th>
<th><strong>Cons</strong></th>
<th><strong>Cons</strong></th>
<th><strong>Cons</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>Carrier &quot;branded&quot;</td>
<td>Can choose any provider we like</td>
<td>Carrier &quot;branded&quot;</td>
<td>Market Mandate for Carrier branded solutions</td>
<td>No core competence</td>
<td>Cost to integrate disparate platforms</td>
</tr>
<tr>
<td>Time to Market</td>
<td>Not core competence</td>
<td>Time to Market</td>
<td>Not core competence</td>
<td>Time to Market</td>
<td>Not core competence</td>
<td>Time to Market</td>
</tr>
</tbody>
</table>

**Figure 10 - Carrier UCC Participation Options**

As shown in the analysis above; partnering and integration of different vendor solutions option would work the best in large Enterprise market for Carriers at the cost of losing control while in SMB market a complicated combination of build, buy and partnering might be suitable for Carrier branding and control. Carriers do not have much strength in large Enterprise space since they do not own the key component i.e. email, IM and voice. They have good distribution channels which they can leverage to create partnership and build expertise in difference UCC solutions to become a system integrator. This would also mean losing control over user experience and becoming an invisible network. In SMB, carriers can replace existing standard TDM lines with more cost effective hosted IP lines, provide a light weight UCC client to manage all real time communication needs and build partnership with someone to provide integrated IM
and email solutions. It will keep the control with Carrier allowing it to capture maximum value in SMB.

5.3 SMB Needs

Computing, communication and messaging are the basic needs of SMB customers as show in the figure 11 below. The highlighted boxes show the products offered by Carriers, not essentially exclusively, and white boxes show ones offered by different equipment vendors. The choice of partnership is also one of the key decisions. Some equipment vendor might have a good UCC solution but it might not fit well with the Carrier strengths or its needs. For this analysis IBM will be used among the top vendors discussed earlier, as an option for Carrier partnership since Cisco and Microsoft have announced a clear intention to enter voice business [14] while IBM is the only supporter of open architecture and equal partnerships as discussed in Chapter 4 on competitive analysis. Microsoft plans to offer its own voice service with conferencing capabilities with an option to integrate with other IP PBXs. Cisco has an end to end UCC solution and does not feel the need for partnership. Microsoft and Cisco recently announced an interoperability partnership. IBM, in contrast, has always tried to build an eco system allowing partners to focus on their core competency.

![Figure 11 - Products offered to SMB](image-url)
There are some unique characteristics of SMB customers. They demand easy installation and configuration with minimal customization, simple integration of products and very reliable technical support as they cannot afford to have personnel for each product. They usually have very limited budgets and want simple pricing. They prefer bundled products with expandable technology with service delivery options like SAAS (Software as a Service). Their traditional channels are system integrators, solution providers and value added resellers. Direct marketers are usually CDW, PC Mall, Insight and PC Connection while they also buy products from retailers like best buy, CompUSA, Staples, Costco and Sam’s Club. In summary they want simple cost effective solutions customized to them. This is why UCC equipment vendors have not been able to target them initially as their solutions are costly and cut out for large enterprises.

The highlighted boxes in Figure 11 are the products and services offered by Carriers while IBM offers the products in white boxes. It shows that a lot of basic computing, live communication and messaging products are already offered by Carriers and some key UCC elements are offered by IBM. There is a possibility of offering integrated solution which complements each other’s strengths.

### 5.4 IBM & Carrier Partnership Structure

We will need to structure a partnership through which both Carrier and IBM are able to capture value according to the value they create while satisfying above mentioned needs for SMB customers.

First we look at the actual assets comprising of complementary products and channels offered by IBM and Carriers to SMB customers as shown in table 12.
Table 12 - IBM and Carrier Existing SMB assets

<table>
<thead>
<tr>
<th>Products and Services</th>
<th>Carrier</th>
<th>IBM</th>
</tr>
</thead>
<tbody>
<tr>
<td>VoIP</td>
<td>Hardware</td>
<td></td>
</tr>
<tr>
<td>Audio Conferencing</td>
<td>Notebook</td>
<td></td>
</tr>
<tr>
<td>Toll Free, IVR, Hunt Group</td>
<td>Desktop</td>
<td></td>
</tr>
<tr>
<td>Mobile Voice, Email</td>
<td>Printers</td>
<td></td>
</tr>
<tr>
<td>SMS</td>
<td>POS, Kiosks</td>
<td></td>
</tr>
<tr>
<td>Data access</td>
<td>Hosted Email</td>
<td></td>
</tr>
<tr>
<td>Web Hosting</td>
<td>Hosted IM</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hosted Web Conferencing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Integrated fax solution</td>
<td></td>
</tr>
<tr>
<td>Ordering &amp; Ticketing Call Centers</td>
<td>Express Advantage Concierge</td>
<td></td>
</tr>
<tr>
<td>Online</td>
<td>Business Partner Ecosystem</td>
<td></td>
</tr>
<tr>
<td>OSS &amp; CRM</td>
<td>Ibm.com</td>
<td></td>
</tr>
<tr>
<td>Customer Care Centers</td>
<td>IBM Financing</td>
<td></td>
</tr>
<tr>
<td>Business Solution Sales</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SMB Customer Base</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 12 - Carrier & IBM combined offer
The existing assets can be used to make a compelling market offering. Carrier’s long term experiences in managing a customer-oriented market space can complement IBM’s strengths in SMB space. One way to structure it is that both can commit to solutions development and go to market strategy together. A hypothetical view of the combined offer with roles and responsibilities of IBM & Carriers is given in the figure 13 below.

Figure 13 - IBM & Carrier Combined Offer Responsibilities

Table 13 shows an example of how the integrated offer can look like in bundled packages.
The competitors offerings in the market do not comprehensively meet SMB voice and computing needs as shown in the analysis done in the below table. This clearly shows the opportunity to form a partnership between IBM and a Carrier to move first and capture maximum value.

<table>
<thead>
<tr>
<th>Packages</th>
<th>OFFERING</th>
<th>OTHER DETAILS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic</td>
<td>• Voice&lt;br&gt;• Hosted voice mail&lt;br&gt;• Hosted fax (routing, document)&lt;br&gt;• Hosted IM with integrated voice presence&lt;br&gt;• Hosted email with PIMS</td>
<td>USAGE BASED INTEGRATED COMPONENTS&lt;br&gt;• Audio Conferencing&lt;br&gt;• Hosted web conferencing&lt;br&gt;FREE COMPONENT&lt;br&gt;• Symphony desktop suite</td>
</tr>
<tr>
<td>Basic + Data</td>
<td>Everything from Basic Package plus:&lt;br&gt;• Data access&lt;br&gt;• Network security&lt;br&gt;• Web hosting&lt;br&gt;• Data backup &amp; network storage</td>
<td></td>
</tr>
<tr>
<td>Basic + Data + Mobile</td>
<td>Everything from Basic + Data plus:&lt;br&gt;• Voice (mobile)&lt;br&gt;• Wireless data&lt;br&gt;• Mobile PIMS</td>
<td>USAGE BASED INTEGRATED COMPONENTS&lt;br&gt;• SMS</td>
</tr>
<tr>
<td>Unbundled Products</td>
<td>• IVR&lt;br&gt;• Hunt Groups&lt;br&gt;• Collaboration tools (Quickr)&lt;br&gt;• Web conferencing&lt;br&gt;• Audio conferencing&lt;br&gt;• Toll Free</td>
<td>Unbundled products can be added to any of the packages with competitive pricing</td>
</tr>
</tbody>
</table>

Table 13 - IBM & Carrier Combined Offers

The competitors offerings in the market do not comprehensively meet SMB voice and computing needs as shown in the analysis done in the below table. This clearly shows the opportunity to form a partnership between IBM and a Carrier to move first and capture maximum value.
<table>
<thead>
<tr>
<th>COMPANY</th>
<th>OFFERING</th>
<th>CHANNEL</th>
<th>REMARKS</th>
</tr>
</thead>
</table>
| Microsoft | - IP Phone system (Response Point)  
- Desktop Software  
- Hosted web conferencing  
- On premise email, IM  
- Web hosting | WEB | OVERALL: Leader  
- Response Point is an IP PBX focused on SMBs  
- Microsoft's solutions are premise based |
| Google | - Hosted email  
- Hosted IM  
- Hosted desktop software  
- Desktop software (StarOffice)  
- Merchant Processing  
- IM based VoIP  
- Search based advertising | WEB | OVERALL: Strong Attacker  
- Google focused on hosted solutions especially targeted at SMBs |
| Yahoo | - Hosted email  
- Hosted IM  
- IM based VoIP  
- Merchant Processing  
- Search based advertising | WEB | OVERALL: Strong Player  
- Yahoo has large installed base for email and merchant processing |
| ATT | - Local  
- Long distance  
- Internet  
- Conferencing  
- Secure email gateway | WEB, DIRECT | |

Table 14 - Competitor SMB Product Offerings
5.5 Capitalizing on SaaS

Software As a Service (SaaS) is defined as software that is owned, hosted, operated and maintained by a service provider. The users obtain the right to use SaaS on pay-per-use or on subscription basis. Generally, the same code base without customization is available to all users who are the ‘multitenants’ of the software service. SaaS is especially attractive for applications fulfilling standard user needs or standard business processes. This allows the users to pay for capabilities as needed, add new users easily and eases IT workload.

Carriers have unique network capabilities while IBM has distinct computing capabilities. These resources can be used to provide on demand services without the need for recurring charges. For example, if users want to have conference call with web conferencing, these can be provided as services with charges based on usage.

Carrier’s SaaS solution will bring the following benefits to SMBs:

- Integrated SaaS and Unified Communication and Collaboration solution
  - Enhanced user experience
  - Simplified administration
- Bundle pricing
- Simplified vendor management
  - One vendor for most of computing and communication needs
  - Existing Carrier relationship with SMBs
- Trustworthy brand
- Sales and service experience with SMB

The major risk is that if the Carriers, in partnership with IBM, don’t provide it, SAAS providers will move in to provide software based SaaS communication services through network mashups.

5.6 Partner Solution Advantages to SMB

An integrated Carrier and IBM offer can fulfill most of SMB needs. It will offer a lot of benefits to SMB customers and will have strong appeal. Some of them are given below:
• Integrated voice & computing solution to fulfill SMB customer needs
  – Unique in the market
• Economic advantage of partnered solution
  – Lower transaction/accounting costs as dealing with single source
  – Lower price (cf. a la carte)
• Reliability of Carrier and IBM
  – Business continuity
  – Investment ability and continued existence of the firm e.g. SunRocket providing
    VoIP went under and customers had to switch.
• Enriched functionality of products due to partnership
  – IM and mobile presence

It will provide ease of set up, use and maintenance. Bundling will lower long term expenses for
SMBs. A hosted solution will also offer the advantages which are very important for SMB who
don’t want to have extra costs:
• Freedom from setup
• Freedom from maintenance and upgrade
• Lower costs to attain high reliability, availability and security
5.7 Partnership Value to IBM & Carriers

The partnership will be valuable to both IBM and Carriers.

Carrier
The Carrier can capture the value by getting the following benefits:

- Unique offering that includes communication and computing
  - Improved customer acquisition and retention
- Investment commitment from IBM for partnership products
  - Access to development
  - Access to marketing
- Cross selling of partnership products through IBM sales channels
  - Increased customer share of wallet

IBM
IBM will also be able to capture major value by:

- Increase in email and IM deployment
- Channel for Symphony through Carrier DSL software distribution
  - Stronger attack/response to Microsoft’s desktop monopoly
- Sales channel to SMB
- Business support systems for SMB
- Billing and technical support for SMB
Chapter 6 - Conclusion

6.1 Summary

UCC is the interoperability of stove piped individual services to make communication easier. UCC will continue to evolve during next five years. It will continue to become a software play with a push from Vendors to make network a dumb pipe thus commoditizing it and move the intelligence and value to applications and services. Carriers will continue to resist it or try to capture maximum value through their traditional dominance in Voice. Large Enterprise market is already penetrated by Vendors and Carriers have an opportunity to play as system integrators and distribution channels. SMB market is still up for grabs with a sound technology strategy.

SMB is a large and growing segment that Carriers could serve profitably. Carriers can leverage its products, brand and existing channels to SMB to succeed in market. Carriers should focus on business services and public sector verticals which are the largest in value. IBM’s lower commitment to SMBs may cause it to lag in SMB market trends that create an opportunity for Carriers to partner with IBM if its goal in SMB segment is to weaken Microsoft. Both IBM and Carriers can create more value in SMB and capture it as first movers in UCC.

6.2 Additional Research

UCC is an area which has multiple dimensions and components. I mainly focused on Email, IM and Voice. Other components mentioned in Framework for UCC can be explored in detail for further study. Another interesting area will be wireless in the context of open access issue and new entry of Google as a contender for 700 MHz spectrum. It will be useful to analyze how it will impact UCC for the wireless incumbents who own access to the current spectrum and therefore own mobile presence and PIM.
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[31] Microsoft Communicator Overhangs the Enterprise Communications Market by Geoff Johnson, May 1 2007, Gartner ID# G00145415
[32] IBM's Unified Communication and Collaboration Strategy: Plugging into Big Blue's Big Bet on Eclipse and Sametime by Wainhouse Research
Appendix A: Original Thesis Proposal
Below is the original proposal for this thesis. It is included here for historical reference and completeness only.

SDM Thesis
Proposal Form

Student Name: Bilal Wahid
MIT I.D. Number: 992661131

Student’s E-Mail Address: bilal@sloan.mit.edu

Today’s Date: 10/1/2007
Thesis Completion Date:

Thesis Supervisor 1: Michael Davies
e-mail Address: mamd@mit.edu

Thesis Supervisor 2: (if more than one)
e-mail Address:

Thesis Title:
A Framework for Unified Communication and Collaboration Strategy for telcos

Motivation:
There is a growing user need to have a uniform communication method through which all the complex communication needs are met. Users want to be able to communicate through email, phone, IM on wireline and wireless in a seamless and cheap way. Different equipment vendors have taken up this challenge and have come up with interesting products which compete directly with incumbent telcos legacy products. There is a pressure on these Carriers to develop a technology strategy for survival.

Thesis Statement & Primary Research Objectives:
Unified Communication and Collaboration is the result of fixed and mobile networks convergence and the possibility of development of applications which are interoperable. Currently there are products such as VoIP, VPN, Contact Center, Conferencing, Security Services, Email, IM, Presence etc which operate in Silos and have very complicated interoperability. Applications are difficult to develop on top of it. The convergence of all communication networks on Internet Protocol and open software platforms has enabled a new paradigm to emerge that will change how people communicate.

I will research Unified Communication and Collaboration area, with a focus on wireless and try to come up with a framework which can clearly identify a technology and business strategy for incumbent telcos. I will look at the following:
• Market Drivers
• Current Market (Revenue, Market share etc.)
• Future Trends
• Competition
• Product Offerings
• Frameworks

**Engineering and Management Content:**

I will look at systems which comprise some key products such as Enterprise VoIP and Conferencing. I will also look at different business models for these products.

**Research Methods & Approaches**

I will use analyst reports such as Gartner, IDC, Forrester and some proprietary information from incumbent telcos. For analysis, I will apply Technology Strategy frameworks learnt during SDM.

**Timeline:**
Sep. 2007 to Dec. 2007

**Signatures:**

SDM Fellow: ________________________________ Date: ____________

Thesis Supervisor 1: ________________________________ Date: ____________

Thesis Supervisor 2: ________________________________ Date: ____________
(if more than one)

Company Sponsor: ________________________________ Date: ____________
(if any)
# Appendix B: Market Sizing

## Number of Firms – US Business 2005 - 2010

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>CAGR</th>
<th>% US Biz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total US Business Firms</td>
<td>11,164</td>
<td>11,372</td>
<td>11,541</td>
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<td>11,996</td>
<td>12,250</td>
<td>2%</td>
<td></td>
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<tr>
<td>SOHO (less than 4 empl)</td>
<td>8,467</td>
<td>8,628</td>
<td>8,739</td>
<td>8,855</td>
<td>9,047</td>
<td>9,219</td>
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<td>76%</td>
</tr>
<tr>
<td>Small Business (5 to 99 empl)</td>
<td>2,589</td>
<td>2,634</td>
<td>2,690</td>
<td>2,757</td>
<td>2,832</td>
<td>2,911</td>
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<tr>
<td>Medium Business (100 to 499 empl)</td>
<td>87,416</td>
<td>99,415</td>
<td>101,071</td>
<td>103,150</td>
<td>105,593</td>
<td>108,171</td>
<td>2%</td>
<td>1%</td>
</tr>
<tr>
<td>Enterprise (500+ empl)</td>
<td>10,507</td>
<td>10,597</td>
<td>10,637</td>
<td>10,785</td>
<td>10,995</td>
<td>11,218</td>
<td>1%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Source: InStat, 12/06

## Number of Employees (in Thousands) – US Business 2005 - 2010

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>CAGR</th>
<th>% US empl t</th>
</tr>
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<tbody>
<tr>
<td>Total US Business Employment</td>
<td>135,041</td>
<td>136,558</td>
<td>137,753</td>
<td>139,322</td>
<td>141,146</td>
<td>143,179</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>SOHO (less than 4 empl)</td>
<td>17,803</td>
<td>18,042</td>
<td>18,209</td>
<td>18,431</td>
<td>18,688</td>
<td>19,965</td>
<td>1%</td>
<td>13%</td>
</tr>
<tr>
<td>Small Business (5 to 99 empl)</td>
<td>38,500</td>
<td>39,101</td>
<td>39,627</td>
<td>40,259</td>
<td>40,943</td>
<td>41,694</td>
<td>2%</td>
<td>29%</td>
</tr>
<tr>
<td>Medium Business (100 to 499 empl)</td>
<td>22,868</td>
<td>23,130</td>
<td>23,326</td>
<td>23,592</td>
<td>23,892</td>
<td>24,240</td>
<td>1%</td>
<td>17%</td>
</tr>
<tr>
<td>Enterprise (500+ empl)</td>
<td>55,870</td>
<td>56,287</td>
<td>56,592</td>
<td>57,039</td>
<td>57,622</td>
<td>58,280</td>
<td>1%</td>
<td>41%</td>
</tr>
</tbody>
</table>

Source: InStat, 12/06

## Number of Remote and Mobile Workers (in Thousands) – US Business 2005 - 2010

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>CAGR</th>
<th>% Empl</th>
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</thead>
<tbody>
<tr>
<td>Total US Business RAM Workers</td>
<td>99,613</td>
<td>100,719</td>
<td>101,577</td>
<td>102,694</td>
<td>104,008</td>
<td>105,474</td>
<td>1%</td>
<td>74%</td>
</tr>
<tr>
<td>SOHO (less than 4 empl)</td>
<td>9,478</td>
<td>9,800</td>
<td>9,986</td>
<td>9,976</td>
<td>9,932</td>
<td>10,076</td>
<td>1%</td>
<td>53%</td>
</tr>
<tr>
<td>Small Business (5 to 99 empl)</td>
<td>27,419</td>
<td>27,856</td>
<td>28,238</td>
<td>28,692</td>
<td>29,184</td>
<td>29,720</td>
<td>2%</td>
<td>71%</td>
</tr>
<tr>
<td>Medium Business (100 to 499 empl)</td>
<td>16,902</td>
<td>19,092</td>
<td>17,233</td>
<td>17,423</td>
<td>17,639</td>
<td>17,691</td>
<td>1%</td>
<td>74%</td>
</tr>
<tr>
<td>Enterprise (500+ empl)</td>
<td>45,813</td>
<td>46,171</td>
<td>46,232</td>
<td>46,760</td>
<td>47,252</td>
<td>47,786</td>
<td>1%</td>
<td>82%</td>
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</tbody>
</table>

Source: InStat, 12/06

## Number of Telecommuters (in Thousands) – US Business 2005 - 2010

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>CAGR</th>
<th>% Empl</th>
</tr>
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<tbody>
<tr>
<td>Total US Business Employment</td>
<td>38,220</td>
<td>39,392</td>
<td>40,474</td>
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<td>43,017</td>
<td>44,446</td>
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<tr>
<td>SOHO (less than 4 empl)</td>
<td>5,492</td>
<td>5,632</td>
<td>5,739</td>
<td>5,666</td>
<td>6,006</td>
<td>6,153</td>
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<td>32%</td>
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<td>Small Business (5 to 99 empl)</td>
<td>12,948</td>
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<td>14,059</td>
<td>14,685</td>
<td>15,315</td>
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<td>38%</td>
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<td>Medium Business (100 to 499 empl)</td>
<td>5,203</td>
<td>5,361</td>
<td>5,507</td>
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<td>5,853</td>
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<tr>
<td>Enterprise (500+ empl)</td>
<td>14,577</td>
<td>14,888</td>
<td>15,169</td>
<td>15,484</td>
<td>15,844</td>
<td>16,230</td>
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Source: InStat, 12/06
Component Level Market Sizing

Total IPT Revenue ($M) for SMB and Enterprise

Source: Telecom Web InfoTech
Revenue ($M) from all Converged Applications for SMB and Enterprise

<table>
<thead>
<tr>
<th>Year</th>
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<th>Enterprise</th>
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<tbody>
<tr>
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<td>78</td>
<td>340</td>
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<tr>
<td>2007</td>
<td>107</td>
<td>556</td>
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<tr>
<td>2008</td>
<td>137</td>
<td>732</td>
</tr>
<tr>
<td>2009</td>
<td>161</td>
<td>925</td>
</tr>
<tr>
<td>2010</td>
<td>182</td>
<td>1079</td>
</tr>
</tbody>
</table>

**Converged Contact Center**
- 2006: 78
- 2007: 107
- 2008: 137
- 2009: 161
- 2010: 182

**Mobility**
- 2006: 81
- 2007: 163
- 2008: 290
- 2009: 292
- 2010: 367

**Personal Productivity**
- 2006: 11
- 2007: 229
- 2008: 333
- 2009: 426
- 2010: 493

**Converged Collaboration**
- 2006: 97
- 2007: 204
- 2008: 278
- 2009: 351
- 2010: 410

**Converged Messaging**
- 2006: 229
- 2007: 308
- 2008: 382
- 2009: 443
- 2010: 492

Source: *InStat, W. Europe from IDC*
Appendix C: Customer Adoption

**IPT**

IPT is the foundation for customers moving to a UC&C solution; as IPT penetration increases, so does the opportunity to embrace a broader set of communications and collaboration tools.

**UCC Applications**

UC covers several different types of IPT based applications, including unified messaging, conferencing and collaboration, mobility and personal productivity.

---

**Source:** Telecom Web InfoTech
Web Services Applications

Web Services Apps include IPT-based application modules that can be accessed and executed by a company's existing business applications which conform to a SOA.

Vertical Market Applications

Vertical Market Apps are IPT-based applications that incorporate telephony features and are designed for a specific vertical market.
IP Contact Center

IP Contact Center includes any call center or contact center that utilizes IP.

Source: Telecom Web InfoTech
Appendix D: Customer Preferences

Q. Which applications do you think will most likely drive future investment in your company's data and telephony network budget?

<table>
<thead>
<tr>
<th>Application</th>
<th>% of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unified messaging</td>
<td>52.3</td>
</tr>
<tr>
<td>Remote/teleworkers solutions</td>
<td>47.7</td>
</tr>
<tr>
<td>Videoconferencing</td>
<td>36.9</td>
</tr>
<tr>
<td>Dual-mode phones (WLAN/mobile)</td>
<td>35.7</td>
</tr>
<tr>
<td>Single-number dial to mobile</td>
<td>26.1</td>
</tr>
<tr>
<td>Audio services</td>
<td>24.2</td>
</tr>
<tr>
<td>Presence management</td>
<td>23.7</td>
</tr>
<tr>
<td>Directory services</td>
<td>20.9</td>
</tr>
<tr>
<td>Custom applications</td>
<td>20.7</td>
</tr>
<tr>
<td>Click to dial</td>
<td>15.7</td>
</tr>
<tr>
<td>Other</td>
<td>4.2</td>
</tr>
<tr>
<td>Don't know</td>
<td>9.9</td>
</tr>
</tbody>
</table>

n = 426

Note: Multiple responses were allowed.

Source: IDC/InfoWorld's Enterprise VoIP Survey, 2006
"What is the most dominant form of internal communication in your organization?"

- Email: 79%
- Face-to-face: 7%
- Telephone: 4%
- Instant messaging: 1%
- Other: 4%
- Web portal: 3%

"If a coworker is unavailable by IM or email, how much time would you save if text messages were automatically sent to their telephone or cell phone?"

- None or not applicable: 16%
- Five minutes or more per event: 31%
- Two to five minutes per event: 28%
- One to two minutes per event: 24%

Base: 67 IT decision-makers and professional workers from North American and European companies (percentages do not total 100 because of rounding)

Source: Forrester's March 2005 Right-Time Communications survey

"At what stage are you in implementing any hardware, software, or services to support unified communications?"

- Fully deployed or upgrade underway: 16% (ENT), 17% (SMB)
- Rolling out or partial deployment: 20% (ENT), 15% (SMB)
- Evaluating or piloting: 36% (ENT), 26% (SMB)
- No plans: 27% (ENT), 41% (SMB)
- Don't know: 1% (ENT), 1% (SMB)

Base: 839 decision-makers at North American and European enterprises

Source: Enterprise Network And Telecommunications Survey, North America And Europe, Q1 2007

42283
"Which of the following initiatives are likely to be a major telecommunications-technology-related priority for 2007? — Implement a unified communications solution."
(scale of 1 [not on our agenda for next year] to 4 [critical priority])

<table>
<thead>
<tr>
<th></th>
<th>ENT</th>
<th>SMB*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical priority</td>
<td>12%</td>
<td>8%</td>
</tr>
<tr>
<td>Priority</td>
<td>24%</td>
<td>19%</td>
</tr>
<tr>
<td>Low priority</td>
<td>31%</td>
<td>31%</td>
</tr>
<tr>
<td>Not on our agenda</td>
<td>31%</td>
<td></td>
</tr>
<tr>
<td>Don't know for next year</td>
<td>1%</td>
<td>42%</td>
</tr>
</tbody>
</table>

Base: 839 decision-makers at North American and European enterprises
*Base: 1,203 decision-makers at North American and European SMBs

Source: Enterprise Network And Telecommunications Survey, North America And Europe, Q1 2007
*Source: SMB Network And Telecommunications Survey, North America And Europe, Q1 2007

Awareness: Overall

Overall, instant messaging and audio conferencing are the most popular types of unified communications among those surveyed (98% and 97% for overall awareness, respectively). Conversely, presence is least known (73% overall awareness).
Frequency of Use: Overall

Frequent usage is highest among instant messaging, audio conferencing and mobile data...and notable, audio conferencing appears to have the highest usage as only 11% report themselves as "non-users." Conversely, PC-based video and room-based video conferencing are least frequently used...particularly, PC-based video is not used at all by 55% of respondents surveyed.

Product Integration Preferences

The three most popular products that respondents would prefer to have bundled are: Audio (77%), video (71%) and web (71%). And despite its popularity regarding both awareness and usage...instant messaging is only preferred as a bundled feature by 47% of respondents. Unified messaging is the least preferred bundle option...however, this may have more to do with lack of awareness of the feature (since the product was not previously defined in the survey).

<table>
<thead>
<tr>
<th>Product</th>
<th>Preference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audio</td>
<td>77%</td>
</tr>
<tr>
<td>Video</td>
<td>71%</td>
</tr>
<tr>
<td>Web</td>
<td>71%</td>
</tr>
<tr>
<td>E-mail</td>
<td>51%</td>
</tr>
<tr>
<td>Instant messaging</td>
<td>47%</td>
</tr>
<tr>
<td>VoIP</td>
<td>32%</td>
</tr>
<tr>
<td>Unified messaging</td>
<td>14%</td>
</tr>
<tr>
<td>Other</td>
<td>1%</td>
</tr>
<tr>
<td>Don't know</td>
<td>10%</td>
</tr>
</tbody>
</table>

Note: Multiple mention question.
Appendix E: IBM

IBM UCC Client
IBM Income Statement

IBM Revenue Profile for Year Ended Dec 31, 2006

<table>
<thead>
<tr>
<th>Industry Sector</th>
<th>2006</th>
<th>2005</th>
<th>% CHG</th>
<th>% CHG COMPANY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public</td>
<td>13,401</td>
<td>14,064</td>
<td>(4.7)</td>
<td>(5.3)</td>
</tr>
<tr>
<td>Industrial</td>
<td>11,535</td>
<td>11,599</td>
<td>(0.5)</td>
<td>(1.6)</td>
</tr>
<tr>
<td>Communications</td>
<td>6,878</td>
<td>6,959</td>
<td>0.8</td>
<td>(3.3)</td>
</tr>
<tr>
<td>Small &amp; Medium Business</td>
<td>14,981</td>
<td>17,597</td>
<td>(15)</td>
<td>(3.8)</td>
</tr>
<tr>
<td>OEM</td>
<td>3,856</td>
<td>3,271</td>
<td>17.9</td>
<td>17.9</td>
</tr>
<tr>
<td>Other</td>
<td>2,756</td>
<td>2,757</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Total</td>
<td>591,424</td>
<td>591,134</td>
<td>0.3%</td>
<td>(0.0)%</td>
</tr>
</tbody>
</table>

- $17 billion or 19% of 2006 revenue came from SMB
- SMB revenue declined from 2005 to 2006 by 3.8%
  - Impact of Personal Computer spin out
- SMB revenue grew 6% ignoring PC divestiture
  - Enabled by growth in ibm.com channel
- Small vs. medium breakdown not available in IBM annual report
- Details on what is being sold to SMB not available publicly

Source: IBM Annual Report 2006
IBM Small Business Products

**Small Business**

- Windows Servers
- Linux Servers
- Disk Storage Systems
- Tape Storage Systems
- SAN
- NAS
- Notebooks (Lenovo)
- Desktops (Lenovo)
- Workstations
- Printers
  - Laser
  - Cut Sheet
- POS & Kiosks
- Backup & Recovery (Tivoli)
  - Storage Manager
  - Data Protection
  - Identity Manager
  - Monitoring Express
  - Provisioning Manager
- Collaboration Tools (Lotus)
  - Sametime
  - Domino Express
  - Messaging Bundle
  - Portal
- Desktop Applications
  - Symphony
- SaaS
  - WebDialog
  - Partner Solutions

Source: IBM Small Business website accessed on Oct 4, 2007
IBM Medium Business Products

Medium Business – Express Advantage

IBM Express Advantage Initiative targeted at medium sized businesses provides complete solutions to customers and partner that are easy to deploy and are competitively priced. A network of IBM Certified Business Partners, Concierge Service & Financing are part of the initiative.

**Software**
- Application & Web Servers (Websphere)
- Information Management (DB2)
- Application Development (Rational)
- Backup & Recovery (Tivoli)
- Collaboration Tools (Lotus)
- Desktop Applications (Symphony)
- SaaS
  - WebDialog

**Services**
- Application services
- Business continuity
- Consulting and systems integration
- IT optimization
- Network and systems management
- Security and privacy
- Technical support

Hardware offering similar to what is listed under 'Small Business' on previous slide.

Source: IBM Medium Business website accessed on Oct 4, 2007

IBM Current Income Mix

**IBM’s view of the IT Industry**

- IBM portrays itself as an enterprise focused company
- IBM has not signaled in equity markets that small business space is strategic

**IBM’s changing income mix**

- IBM derived 40% income from software in 2006 – highest of all LOBs
- Software is highest margin business providing 40% net on 20% revenue in 2006
- Middleware provides most of software revenue

“IBM’s strategy is to deliver integration and innovation to enterprise clients through higher-value offerings.” [verbatim quote from Murphy’s presentation]

Source: Patricia Murphy, Vice President Investor Relations, presentation to European investors in early September, 2007.
Appendix F: Cisco

Cisco UCC

Cisco Mobility Components

Cisco Unified Mobile Communicator

Dual Mode Phone

Cisco Unified Wireless IP Phone 7921G

Cisco Unified Communications applications

Unity Connection

Phone Applications Suite

IP Contact Center

MeetingPlace Express

Personal Communicator

Network Management

Videoconferencing

Cisco Unified Communications Manager 6.0 Business Edition

Cisco Unified IP Phone 7931G

Cisco Unified Communications systems

UCC Test bed

Test bed for Cisco Unified Communications, system Release 6.0
Cisco Unified Communications Services

Cisco Planning and Design Service Bundle

Cisco Select Operate Services (US/Canada)
Cisco Remote Management Service
Cisco Essential Operate Service
SMARTnet
SAS/SASU*
Cisco Optimization Services

Prepare
Plan
Design
Implement
Operate
Optimize

PDI Help Desk for Certified UC Partners
Lifecycle Services e-Learning
Steps To Success—Lifecycle Services Support (SMB & Mid-market)

*Availability Limited to Products Like Unified Communications Manager Express or Unity Express

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